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THE introduction of new locomotives on a road has seldom attracted as much attention from the traveling public as it has in the case of the new Pacific type engines on the Lackawanna. The prevailing types of passenger power on that road have been the eight-wheel and the ten-wheel "camel-backs," with the engineman's cab placed well forward over the barrel of the boiler. The new locomotives are much larger and more powerful; the diameter of the barrel of the boiler is so great that it was impossible to place the cab over it and it has been moved to the rear, as on the ordinary locomotive. The change in appearance from the standard types of power on the Lackawanna is so great that the new locomotives are objects of considerable interest to those who have been in the habit of using that road, and it is not unusual to see crowds of commuters gathered around them at the terminal station. This is the second lot of this class of locomotives to be built for burning hard coal, the first ones having been introduced on the Lehigh Valley several years ago. They were somewhat lighter than the Lackawanna engines, weighing 241,360 lbs., as compared to 284,000 lbs. for the latter. The ten-wheel locomotives on the Lackawanna have not been able to make time with the heavy fast passenger trains over the mountains and it has been necessary to double-head. The new locomotives will handle the trains easily, for they were designed to do the work on the basis of using saturated steam. The addition of superheaters insures their being able to haul the trains readily and to handle even heavier ones than are now being hauled. The extremely long main driving box, which has only been used on two New York Central locomotives up to this time, promises to give excellent results, and will undoubtedly be used extensively on future engines. These locomotives, which are described in another part of this issue, have an exceptional number of novel features.

THE opinion rendered by Commissioner Lane of the Interstate Commerce Commission in the express rate cases looks to radical changes in the methods of making express rates and to heavy reductions in them. It also contemplates extensive changes in the methods of handling express business. A statement issued for the express companies sets forth that the proposed rates would so drastically reduce the companies' revenues that they would not cover the cost of handling the business. The position of the commission appears to be that the express company is merely an agent of the railway for handling certain kinds of business, and that it is not reasonable for it to charge any higher rates than it would be proper to charge if the express business were handled directly by the railway itself. The railways have in the past been compensated for handling express business by being paid about one-half of the gross express receipts. Therefore, whatever reduces the earnings of the express companies will reduce the compensation of the railways for handling express business unless some change be made in the method of compensating the railways. The commission issues no order at this time, but has given the express companies until October 9 to show cause why the proposed rates should not be adopted. The past course of the commission in similar circumstances indicates, however, that after the hearing it will order the proposed rates applied. That the matter will end there seems most improbable. Appeal to the courts and protracted litigation are more likely. Meantime, intelligent comment on the commission's attitude is impracticable, mainly because of the novelty of the basis on which it proposes to establish the rates. One comment, however, it seems safe to make. This is that the proposed order, if enforced, would be a remarkable example of the exercise of power by an administrative commission. Whatever wrongs the express companies may have committed, the fact is that their properties have been developed, their securities have been issued, their rates have been made and their earnings have been built up over a long period of years

with the full knowledge and assent of the lawmakers, the public authorities and the public of the United States. The administrative commission which, after all this, can step in and require great changes in the business methods of the companies, sweeping alterations in their methods of making rates and heavy reductions in their rates and earnings, is a body possessing very large authority indeed—authority the effects of the continued vigorous exercise of which on business and the public welfare no one can now foretell.

REDUCING THE ACCIDENT RECORD.

IN the *Railway Age Gazette* of June 7 there appeared an address by F. C. Rice, of the Chicago, Burlington & Quincy, in which he called on the American Railway Association to take active measures to reduce the accident record; and in an editorial commenting on this address we named as the three most obvious paths open for the carrying out of Mr. Rice's suggestion (1) the suppression of trespassing, (2) increased attention to the human element as a main factor in the causes of many accidents, and (3) more particularly a campaign of education and a vigorous enforcement of rules, as a means of accomplishing task No. 2; that is, as a preventive of those accidents which are due to misconduct or neglect of employees. A correspondent criticises Mr. Rice and the editor as follows:

"I have read your articles with care and with much interest, and, surely, your main points are well taken. But both Mr. Rice and yourself speak almost wholly in generalities. You lay stress on the breaking of rules by the employee, and you urge the railways to do something; but the reader looks in vain for specifications. To what rules do you refer? In the matter of trespassing you have well said that the responsibility lies at the door of the public. No one can complain at your radical attitude concerning the remedy for this disgrace. . . . But, are you not using rather strong language when, referring to the fact that many of the trespassers are respectable citizens (not tramps), you say that they are as good as passengers? If you were to discuss the innate moral character of individuals, or their motives as citizens, quite likely you might find people on passenger trains who would rank even much below the industrious and law-abiding factory employee—man or woman—who, going to and from work, walks along the track; but, after all, it is necessary in so serious a problem to take a logical and business-like view, and it seems to me that the railway is well justified in separating these two classes. Certainly, in his relation to the railway, the passenger is a well-meaning citizen, doing his best to take care of himself. With trifling exceptions, the passenger boards the train with the full intention of obeying the railway company's regulations as to safety. The track walker, on the other hand, is deliberately disregarding rules of simple common sense, to say nothing of railway regulations or statutory prohibitions. Finally, by your silence, you appear to ignore the fact that a great many accidents to employees are due to the carelessness or thoughtlessness of well-meaning and even well-qualified men. Shall we cease our efforts to save lives as soon as we have reformed the reckless rule breakers?"

In so far as this criticism refers to silence or omissions, we can readily agree with the writer. A single editorial cannot cover everything. The subject which was dealt with has many ramifications. Our correspondent, however, is not a railway officer. No officer in the operating department would complain of a lack of definiteness in our suggestions. He would know too well that they refer to immediate problems. However, as our correspondent's state of mind may properly be taken to be similar to that of a state railway commissioner, or some one else charged with a public duty, we are only too glad to consider his suggestions.

First, then, as to trespassing. Take a concrete illustration. A division superintendent in the course of a week has forty train riders or track walkers arrested. Perhaps one or two of these, at the outside, will receive jail sentences. The majority of the trespassers will, at the very worst, get off with suspended sentences, and those of the culprits who are respectable citizens will certainly suffer nothing more than a reproof from the magistrate. The deterrent effect, as a whole, is exceedingly small. Reflecting on such a result, that superintendent sees that he has before him a long and tedious campaign, to arouse to their duty those magistrates who are responsible for this failure of the law—a real miscarriage of justice. He will be forced to use the press, and perhaps to try to stir up a state legislature. A general officer must spend time and effort in backing up division officers who are confronted with this problem. Both general and division officers must keep up the pressure month in and month out, seeing that agitation is renewed as often as there is a chance to accomplish anything. There is nothing pleasant or easy about the task. To go before Congressional committees is boys' play in comparison. But what other remedy is in sight? We cannot get away from the hard fact that on the courage and vigilance of prosecuting officers and local magistrates depends, in large part, the welfare of the community. If our correspondent were a railway commissioner, he could not do better than devote a good part of his next annual report to a chapter, giving facts and figures, backing up the railway superintendents in his state who are trying to do their duty in this respect.

Second, as to the human element in causing accidents. As to collisions, the position of the *Railway Age Gazette* is pretty well known. The block system is the one general remedy. But, for years to come, we can have, on many lines, only the manual block system, and with this system alone the great danger is at the stations. The use of the block system will do away with many questions of discipline and of officers' winking at infractions of rules by employees, but it remains true that, except with thorough and comprehensive interlocking, there will still be the same old possibility of numerous collisions at and near stations because of lax observance of rules.

As to derailments, a large share are due to defects of roadway or equipment, the discussion of which must be omitted for the present; but an appreciable share are due to errors of trainmen. Mr. Belnap, of the Interstate Commerce Commission, found that in five years 6 per cent. of the derailments reported to the government were caused by negligence; and the resulting deaths averaged one a week. This negligence, analyzed, turns out to be: excessive speed, lack of caution in switching, failure to secure cars with hand brakes when they are left unattended, leaving switches (not interlocked) in wrong position, turning switches under moving trains, failure to watch bridges when there is danger of fire, failure to take precautions when repairing track, and so on. Curing these faults is not easy, but every superintendent could make a hopeful beginning if he had the necessary authority. He must have time to inform himself fully concerning the quality of all his men, must have thoroughly satisfactory and competent assistants to aid him in doing this, and must have the backing from the general manager and the sinews of war from the treasurer to enable him to get rid of (or transfer) every inefficient man.

It is observed that most of the accidents which result seriously to employees occur in yards. For the purpose of the present discussion, we may perhaps consider as in one class (a) the minor collisions, not preventable by any block system except the most complete, (b) derailments which are due to negligence in operating, and (c) those other accidents in yards which make up the great bulk of the injuries, fatal and otherwise, to employees. For these varied mishaps there are varied causes; but they may be dealt with together, because when misconduct and negligence are attacked at the foundation it is found that the remedy becomes simple. Getting at fundamental causes we are able to apply simple and comprehensive remedies.

And here we come upon the distressing totals which include the errors of well-meaning and competent employees, mentioned by our correspondent. The railway officer is not, indeed, without a

serious responsibility in the matter, and yet he has a most difficult task. Referring to the last annual statement of the Interstate Commerce Commission, bulletin No. 40 (page 23), which was reprinted in the *Railway Age Gazette* November 10, 1911, it will be seen that the fatal accidents due to being struck or run over by an engine or a car at stations or in yards (Class C 9) was 1,970; and, deducting from this total the trespassers and the passengers, we have *nine hundred and twelve* fatal accidents from this cause in one year, to employees, on and off duty, and to "other persons" not trespassing. This is the largest of the eleven items making up the total of accidents, other than train accidents, as shown in the large table of the government record; and there can be no doubt (1) that these are due very largely to carelessness of the victims, and (2) that many of the victims are by no means to be classed as reckless. Fatal accidents of this kind to old employees, known to be careful, and perhaps to be classed as being as careful as experience can make them, are so common as to be familiar everywhere. The total referred to is made up of 137 trainmen, 111 yard trainmen, 43 switch tenders, etc., 172 trackmen and bridgemen, 226 other employees, 90 unclassified employees who were not on duty, and 133 non-trespassers (mostly persons doing business at stations). The other similar item (being struck or run over at other places) contains a total of 508 employees on duty, including 313 trackmen and bridgemen, and 111 not on duty. Of employees not on duty, the total number killed during the year, by all causes except train accidents, is 279.

As we have said, the problem of saving the hundreds of lives thus sacrificed annually is a difficult one. The safety committees, from which such gratifying results have been had within the last year or two, have proved a most refreshing novelty in the railway world. But the work of these committees again reminds us that the railway machine has grown so rapidly and to such huge proportions that some quite obvious duties have been neglected; that the enormous consolidations that have characterized the railway world during the past 30 years have not been unmixed blessings. But the safety committees, good as they are, are not everything. On the one hand their activities must be largely general and advisory, rather than compulsory, and on the other hand a more specific application of the methods of the committees may be found either impracticable or useless.

The railway manager who essays to cure this insidious disease, carelessness, cannot work through committees. There must be on every division, and perhaps at every large station, one man, or a very few men, clothed with executive authority. By the exercise of special Herculean energy on the part of some one officer it may be possible to instruct and exhort the men in some one large yard (incidentally replacing the dullest with better men) so as to reduce the number of killed and injured for a year in such degree as to enable the results to be formulated into a definite lesson. If some one, or a few, yardmasters or trainmasters should undertake a task of this kind, possibly the results would be such that their methods could be described and the report disseminated by the American Railway Association. For reasons already suggested we speak with caution; but the fact that the problem is difficult does not justify neglecting it. To concentrate attention on one small locality may seem to be a neglect of other localtities; but a beginning must be made, and it should be made under circumstances where the fullest resources in men and money are available. There is pressing need of doing *something*, if only to answer the critics. To see that men obey the rules in regard to handling car couplers and to taking time to do a thing when it seems easier to hurry; to detect and reprimand men who take unnecessary risks, the officer in charge must do something more than issue orders. He, or some one exercising powers equal to his, must do the work on the ground. Employees who walk on the track when they could just as well walk at the side of the track cannot be disciplined at long range.

When railway officers shall have lessened and diminished the list of these particular faults they will find that they have also worked an equally gratifying reform in the other features of the record. The officer who tackles the track-walking problem will soon find himself interested in other classes, "falling from cars," "being struck by overhead bridges," etc. After studying track walking by brakemen in yards he will soon give attention to the 485 track laborers who were run over and killed in the same way. Enjoining on the employees more carefulness for their own protection, he will find that they will be less careless in those matters which affect the collision record.

THE EXTENT OF GOVERNMENT OWNERSHIP.

THE idea has been industriously disseminated by advocates of government ownership of railways in the United States that this has become the prevalent policy of the world, and, especially, the policy of the leading nations. It has been referred to as "the policy of civilization," the implication being that the failure of the United States to adopt it classifies this country with nations that are not praticularly civilized. Statistics recently published by the *Archiv fur Eisenbahnwesen* regarding the mileages of the railways owned by the governments and by private companies in the various countries throw instructive light on this subject. We give herewith in full these statistics, with the figures for kilometers converted into figures for miles:

STATE AND PRIVATELY OWNED RAILWAYS IN EUROPE—JANUARY, 1910.

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
Germany	3,364	34,548	37,912
Austria-Hungary	5,512	21,998	27,510
Great Britain	23,299	.....	23,299
France	25,120	5,499	30,619
Russia (in Europe)	15,316	21,611	36,927
Italy	1,704	8,811	10,515
Belgium	2,596	2,680	5,276
Luxemberg	199	118	317
The Netherlands	919	1,061	1,980
Switzerland	1,217	1,698	2,915
Spain	9,296	.....	9,296
Portugal	1,134	670	1,804
Denmark	972	1,215	2,187
Norway	363	1,554	1,917
Sweden	5,958	2,711	8,669
Servia	137	356	493
Rumania	259	1,975	2,234
Greece	980	.....	980
Bulgaria	119	985	1,104
Turkey (in Europe)	965	.....	965
Malta, Jersey, Man	68	.....	68
Total	99,497	107,490	206,987

STATE AND PRIVATELY OWNED RAILWAYS IN AMERICA—JANUARY, 1910.

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
Canada	22,956	1,715	24,671
United States	240,667	.....	240,667
Newfoundland	665	.....	665
Mexico	15,227	.....	15,227
Central America	1,595	.....	1,595
Greater Antilles	2,983	42	3,025
Lesser Antilles	335	.....	335
Colombia	509	.....	509
Venezuela	632	.....	632
British Guiana	104	.....	104
Dutch Guiana	37	.....	37
Ecuador	332	.....	332
Peru	739	842	1,581
Bolivia	755	.....	755
Brazil	7,818	5,431	13,249
Paraguay	157	.....	157
Uruguay	1,543	.....	1,543
Chile	1,841	1,678	3,519
Argentine Republic	15,292	2,462	17,754
Total	314,187	12,170	326,357

STATE AND PRIVATELY OWNED RAILWAYS IN ASIA—JANUARY, 1910.

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
Russia (in Asia)	4,615	6,167	10,782
China	5,409	.....	5,409
Japan, including Korea	1,548	4,532	6,080
British India	7,615	24,406	32,021
Ceylon	575	.....	575
Persia	33	.....	33
Asia Minor, etc.	2,213	910	3,123
Portuguese India	51	.....	51

STATE AND PRIVATELY OWNED RAILWAYS IN ASIA—JANUARY, 1910—(*Continued*).

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
Malay States	756	.....	756
Dutch India	1,548	.....	1,548
Siam	.....	636	636
Cochin-China, etc.	2,174	.....	2,174
Total	26,537	36,651	63,188

STATE AND PRIVATELY OWNED RAILWAYS IN AFRICA—JANUARY, 1910.

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
Egypt	880	2,786	3,666
Algeria and Tunis	3,127	.....	3,127
Belgian Congo	515	.....	515
Union of South Africa—			
Cape Colony	452	3,311	3,763
Natal	.....	1,091	1,091
Central South Africa	.....	2,584	2,584
Rhodesia	.....	2,187	2,187
German Colonies	.....	1,687	1,687
English Colonies	1,803	.....	1,803
French Colonies	1,357	.....	1,357
Italian Colonies	71	.....	71
Portuguese Colonies	999	.....	999
Total	9,204	13,646	22,850

STATE AND PRIVATELY OWNED RAILWAYS IN AUSTRALASIA—JANUARY, 1910.

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
New Zealand	29	2,711	2,740
Victoria	14	3,483	3,497
New South Wales	141	3,634	3,775
South Australia	171	1,907	2,078
Queensland	351	3,652	4,003
Tasmania	164	468	632
West Australia	276	2,140	2,416
Hawaii, etc.	88	.....	88
Total	1,234	17,995	19,229

STATE AND PRIVATELY OWNED RAILWAYS IN THE WORLD—JANUARY, 1910.

Country.	Private Lines.	State Lines.	Total Mileage.
	Miles.	*Miles.*	*Miles.*
Europe	99,497	107,490	206,987
America	314,187	12,170	326,357
Asia	26,537	36,651	63,188
Africa	9,204	13,646	22,850
Australasia	1,234	17,995	19,229
Total	450,659	187,952	638,611

It will be seen that of the total mileage of the world in January, 1910—which was 638,611 miles—private companies owned 450,659 miles. or 70.57 per cent., and governments owned 187,952 miles, or 29.43 per cent. The bulk of the privately owned mileage was in the United States, the length of line in this country being given as 240,667 miles, which is 52,715 miles more than the aggregate length of all the state-owned railways in the world. However, outside of the United States the mileage owned by companies is 209,992 miles, or 22,040 miles greater than the total state-owned mileage. Measured by mere length of line, therefore, private ownership is still overwhelmingly the railway policy of the world.

It cannot even be said truly that in point of mileage government ownership has become the policy of most of the leading countries of the world. Most of the railways of Austria-Hungary are state-owned, but most of those of France are still in private hands. Most of the railways of Italy and Russia are state-owned, but in the principal country of South America, Argentina, with a mileage greater than that of Italy, and in Canada, with a large and rapidly growing mileage, private ownership is greatly preponderant. Japan is committed to government ownership. But in the United States, with a mileage exceeding that of the combined state-owned railways of all the world, private ownership is still the exclusive policy. Germany has adopted government ownership, but Great Britain adheres to private ownership. Even in point of investment represented and business handled, the privately-owned railways surpass the state-owned, although not to so great an extent in these respects as in point of mileage.

Figures regarding ownership do not exactly reflect the facts as to management. Many railways that are owned by governments are leased to and managed by private companies, and, on the other hand, many railways that are owned by private companies are leased to and operated by governments. For example, in Holland most of the mileage is owned by the state, but all of it, we believe, is operated by private companies. In Austria there are, or recently were, found side by side public operation of state-owned lines, private operation of state-owned lines, private operation of privately-owned lines and state operation of privately-owned lines. In Peru, as in Holland, most of the mileage is state-owned, but all, or practically all, is privately managed. In India most of the mileage is state-owned, but a very great part of it is operated by private companies. In Mexico private companies built all the lines and still operate them, but the state has acquired a controlling part of the companies' stock. The railways of Nicaragua and Guatemala are state-owned, but they are leased to and operated by private companies. It would appear that the preponderance of private management is about the same as the preponderance of private ownership.

It is often better to be warned by than to follow the example of others. Not the mere fact that others do a certain thing, but the results of the course taken by them are what should mainly influence our conduct. So far, however, as the example of the world is any argument at all, it is an argument against rather than in favor of government ownership.

NEW BOOKS.

Manual of Statistics, 1912. Manual of Statistics Company, 20 Vesey street, New York. 1098 pages. Price, $5.

The great value of this standard book of reference lies in the wide field which the hand book covers. It gives quotations on all the leading American exchanges for 1911, and gives a quite complete history of the money market for the past four years. It covers capitalization, dividends, etc., for banks, as well as giving statistics for railways and industrial companies. The book is compact, and for one that covers so large a field is quite light and easy to handle. Its figures are well arranged and easy of reference.

Valves, Valve Gears and Valve Diagrams. By Franklin DeR. Furman, M. E., professor of machine design at the Stevens Institute of Technology, Hoboken, N. J. 152 illustrations. Cloth, 8 in. x 10 in., 130 pages. Price, $3.50.

A paragraph in the preface indicates that this volume is a small edition published privately by the author with the expectation of printing later a more complete treatise in better form. It is a collection of notes for use in the class room, arranged to fit in with the general course in mechanical engineering at Stevens Institute. This feature is too strongly emphasized to make the book a satisfactory one for the general use of young engineers. As a guide to the student in designing valves and laying out valve gear, it may be regarded as a good general treatment in compact shape, orderly arranged and well indexed. The section relating to piston valves and the Walschaert valve gear as used on locomotives is too brief to make the book of value in the locomotive drafting room. The most useful portion in this respect is the condensed arrangement of the Auchinclos method of design of the Stephenson link motion. The illustrations are uneven and often crude, and the technique of the drawing is so poor that it comes with poor grace from a teacher of machine design in a prominent institute of technology. The lettering and figuring is different on nearly every cut. The section of the cylinders and valve of the Vauclain compound locomotive, on page 43, and that of the Lentz gear, on page 143, are good examples of the kind of illustrations which we should like to see in engineering books. But the good drawings are marred by careless lettering. The student should have set before him the best examples of good technique in mechanical drawing, if he is to obtain proper ideas in regard to correct appearance as well as correct proportion in machine design. In another edition this feature of the book should have considerable improvement, with the use of uniform sections and lettering and a higher standard for the general finish of the drawings.

Letters to the Editor.

LOST AND STRAYED FREIGHT.

MONTREAL, July 1, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The discussion of lost, strayed, damaged and stolen freight goes on without end. But seldom do we see, or hear more than a mere recital of woes. No one seems to want to put his finger on a sore spot, and point out a cure for that one spot. All prefer to discuss the matter in a general way, and leave it just where they find it. Now, one at a time is good fishing, so if we get down to business, and cure one spot at a time, we will eliminate all the spots sooner or later. To go on talking, and do nothing, will not improve conditions.

The spot I want to deal with just now is the freight house in the city, and the *man* I want to draw attention to first is the freight checker.

My experience with freight shed people began when I was a young boy, and I know now that boys observe considerably. Going from one freight house to another, I first learned that freight checkers were really a type, just as yard shunters are; they were a class by themselves. And I got to know beforehand just about what kind of a reply I would get from any of them. When the reply differed from the standard I knew there was a man on deck there who would not remain; he would not last long enough to get into the "class." He might go either up or down, but go he would. In spite of all my years of contact with these men I am still puzzled to know where most of them come from. They all seem to be of about middle age. One goes and there is another so much like him in his place that you can't tell the difference. They are always men of very ordinary ability, and they are generally tired, and oh! so cynical. They are the great original stand patters. Who of you has ever got one of them to acknowledge a mistake? One of them whom I know for many years had one reply to all questions with reference to goods short in cars that had been loaded at his shed. He was not a good letter writer and knew too much to try his hand at such things, but on all papers referred to him would be found his sign-manual, "Duly checked and duly shipped or delivered." I have seen way freight conductors and local agents shed tears of baffled rage over those five words, and I have heard them say things that I hope will not be set down against them, for some of them were really decent husbands and fathers—on off days, anyway. The goods might be found in the shed, or they might never be found. But there was the record, "Duly checked and duly shipped," the alpha and omega of the whole matter. This man was, and is—for he is still a checker—typical of his class. I suspect he was right not more than half the time, yet he is still checking freight, "duly checking and shipping," after 30 years. Where, and at what age he began I don't know, and he has not been in the same shed all the time I have known him, but he is still a checker.

Now, why, in dealing with a matter of such importance as lost, strayed, and damaged freight, have I commenced with the checker, this middle-aged, middle-class, middle-paid, and often overworked individual? Well, I guess it is simply because I could not very well begin anywhere else, for notoriously bad as he is he is after all the foundation stone of the whole edifice. He it is who receives the public's goods, and delivers them to the public. He it is who comes in contact with the public, and on whose work all those clerks in the front office are busy. How many letters does the agent write for which the information furnished by the checker does not form the basis? On whose say-so does the claim office so often fight its claims?

Oh, yes, I know all the exceptions; but what I want to point out is the rottenness of the foundation. How long will it be before our railways wake up to the conditions? When will they stop putting men into this position because they are cheap? They are all looking for good checkers; of course they are, but at a price. They never paid more than so much for a checker —why should they pay more? Will they never learn that the right man is cheap at any price? That their freight handlers should all be picked men at no matter what cost? The day they learn this they will begin to save money so rapidly they will wonder how it happened, and the first railway to learn it will take business away from its competitors to an extent it never dreamed of. The old ideas must go; the old checker must go; we want younger men—men of ability, men big enough to stand behind their mistakes, and rectify them—and we must pay these men. The checker's job is a big one that has never yet been handled by big men. It is time it was.

Today the average freight department man cannot conceive of a freight department without a certain number of mistakes each day. There always has been; there always will be; why rebel against the unevitable? Once this is admitted, who is to decide what number of mistakes is reasonable? The result of such training and invironment can easily be imagined. But we don't have to imagine it. We can see it every day. And where it has not been checked with a firm hand it grows to what we see it at many of our large freight terminals. The freight men, from trucker to general agent, have come to regard mistakes, their own and others, as part of the day's work, and the result is what we see.

A large freight terminal is an immense proposition, but if we sit down and say it cannot be handled right it certainly never will. The public suffer greatly on account of the poor showing made by our railways in dealing with this matter, and they would not have stood it as long as they have, if it had not been that the railway pays up and stands the loss in the end.

What this loss is we really don't know. We may know how much we have paid out for lost and damaged freight, but how can we estimate what our loss has been through freight diverted, loss of friends? Today, and for many years, we have been forging a chain of evils. Beginning with the second class man holding the checker's job it continues through the whole piece. The young man going in as a clerk is taught by example that mistakes are a regular part of the day's work, and he sees more time taken up and energy exerted in avoiding responsibility for mistakes than would, if properly used, prevent the mistakes in the first place. Is it any wonder that he becomes an "artful dodger" rather than a straightforward official when it comes his turn to assume command, and trains another batch of side-steppers? The motto of most of our freight houses might well be "tell a lie and stick to it." Don't let the fact that your company will have to pay weigh with you. If you tell J. Smith that his goods have not arrived, and find that you were in error, don't acknowledge it. You can tell another lie later and cover the former one up. If you tell Jones his goods went forward at a certain time, and find they did not, don't tell him you made a small mistake. Smith and Jones may both make complaint later, but by the time that complaint gets around there will be a dozen more that are more serious, and who is going to *prove* you a liar, anyway? The man who might, and should do so, has troubles of his own. If he discharges you he will only get another of the same breed, for he has no money to pay better men.

I wonder if Major Hine could be induced to alight from his transportation balloon and tackle this job on the ground? Here is a sample of the things he would run up against: He would find a shipper in one city short of goods that the local agent cannot find. The checker at the other city 200 miles away, through the agent, has been stating for a month that the goods went forward, but *on going and looking in his shed* the goods are found there where they have been all the time. What would he do in such a case, and what would he say to the merchant in order to hold his business, keeping in mind that he cannot get money to hire a better quality of man than the liar he would like to discharge?

Just this thing, and many much worse, are happening every day. You can't cure them by talking organization from a balloon; and in the aggregate they are almost life or death to the railway.

OBSERVER.

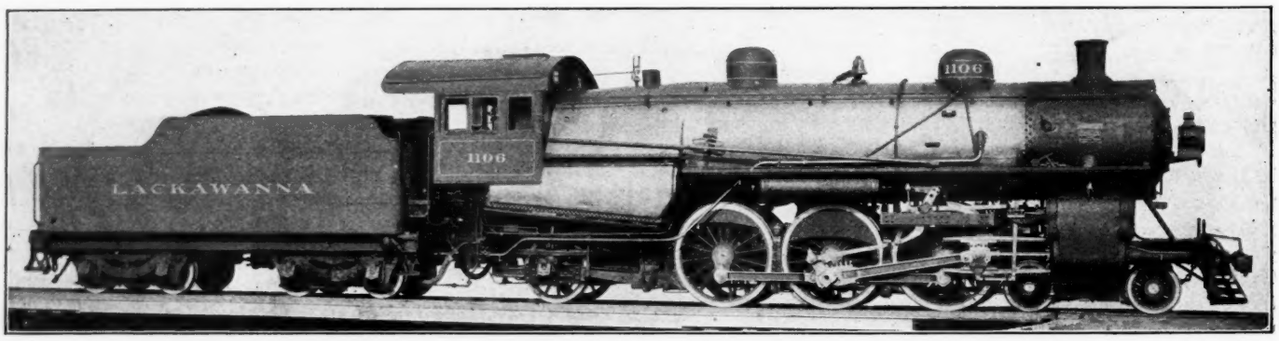
ANTHRACITE BURNING PACIFIC TYPE LOCOMOTIVES.

Introduced by the Lackawanna to Haul 460-Ton Trains at Sustained Speeds of 30 Miles an Hour on 1.6 Per Cent. Grades.

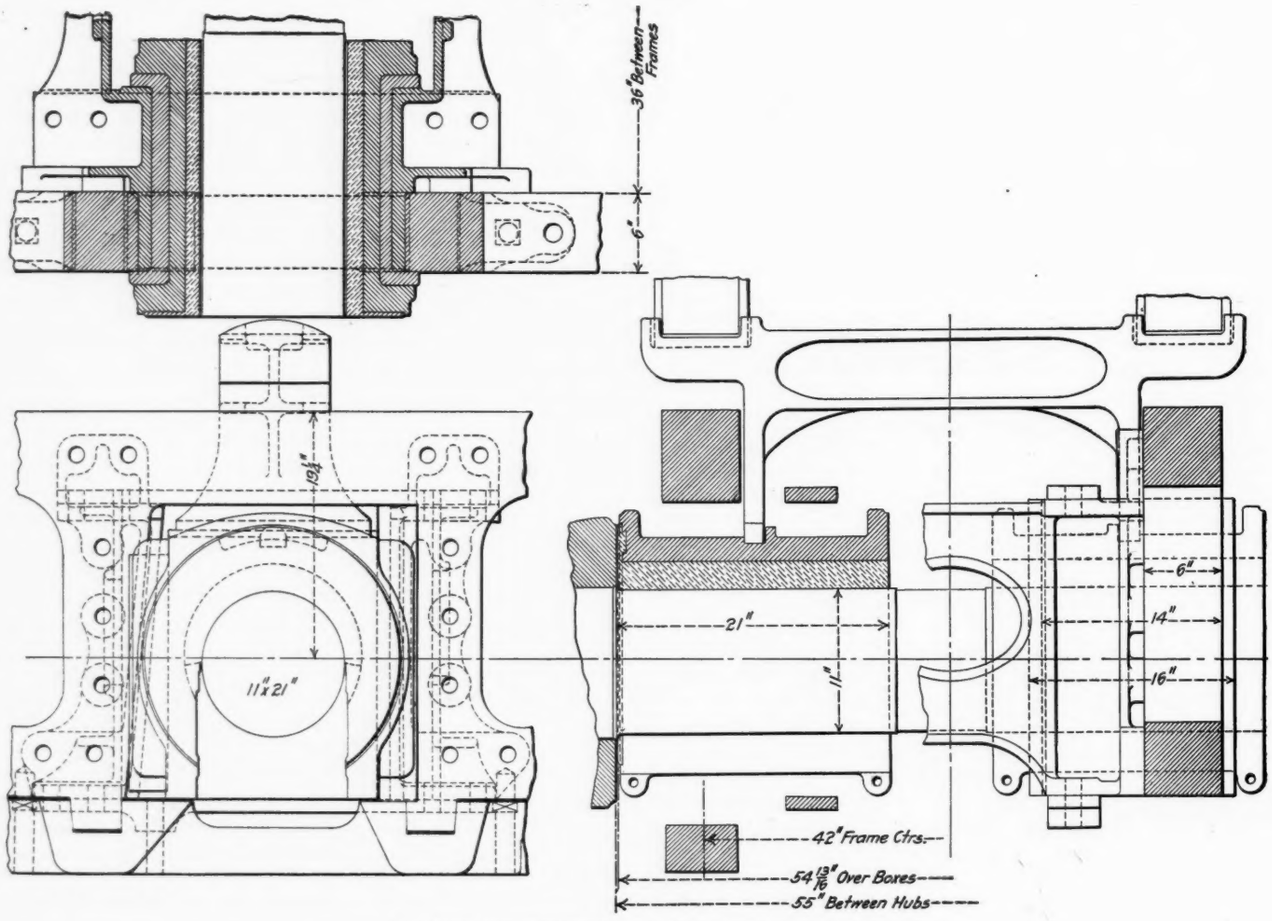
Seven of these locomotives, the second lot of this type ever built to burn hard coal, have recently been received by the Delaware, Lackawanna & Western from the American Locomotive Company. They weigh 284,000 lbs., have a tractive effort of 40,800 lbs. and will replace ten-wheel locomotives having a total weight of 217,000 lbs. and a tractive effort of 34,860 lbs. These locomotives are to be used in passenger service between New York and Elmira.

Westbound on the New York division is a long steep ascent with a maximum gradient of 1.6 per cent. from Stroudsburg, Pa., to Pocono Summit, a distance of 21 miles; here the road crosses Pocono Mountain. Eastbound from Scranton, similar grade conditions exist going up the other side of the mountain. The schedules of the fastest trains require a sustained speed of practically 30 miles an hour over these grades. Regulations, rigidly enforced, limit the speed to schedule time on the down grade, and time lost in going up cannot be made up on the down grade on the other side.

With over 6 cars, or 325 tons, it is beyond the capacity of one of the present 10-wheelers, whose general dimensions are shown in the table on the following page, to meet the above requirements.



Pacific Type Locomotive for Burning Hard Coal; Delaware, Lackawanna & Western.



A New Development in Main Driving Boxes.

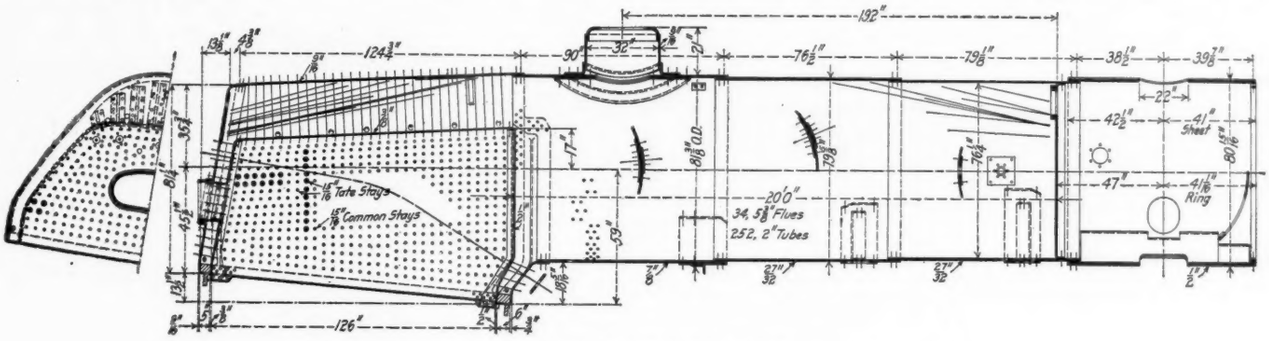
General Dimensions of Lackawanna Ten-Wheel Passenger Locomotive.

Fuel	Fine anthracite
Maximum tractive effort	34,860 lbs.
Wheel base, driving	14 ft. 4 in.
Wheel base, engine	25 ft. 6 in.
Wheel base, engine and tender	55 ft. 1½ in.
Weight on leading truck	46,000 lbs.
Weight on driving wheels	171,000 lbs.
Weight, total of engine	217,000 lbs.
Weight of tender	135,000 lbs.
Cylinders, diameter and stroke	22½ in. x 26 in.
Driving wheel diameter	69 in.
Boiler, diameter at front end	74 in.
Boiler, working pressure per sq. in.	215 lbs.
Firebox, length and width	138 in. x 108 in.
Tubes, number	398 in.
Tubes, diameter	2 in.
Tubes, length	15 ft. 3 in.
Heating surface, tubes	3,158.5 sq. ft.
Heating surface, firebox	228.5 sq. ft.
Heating surface, total	3,387 sq. ft.
Grate area	103.8 sq. ft.

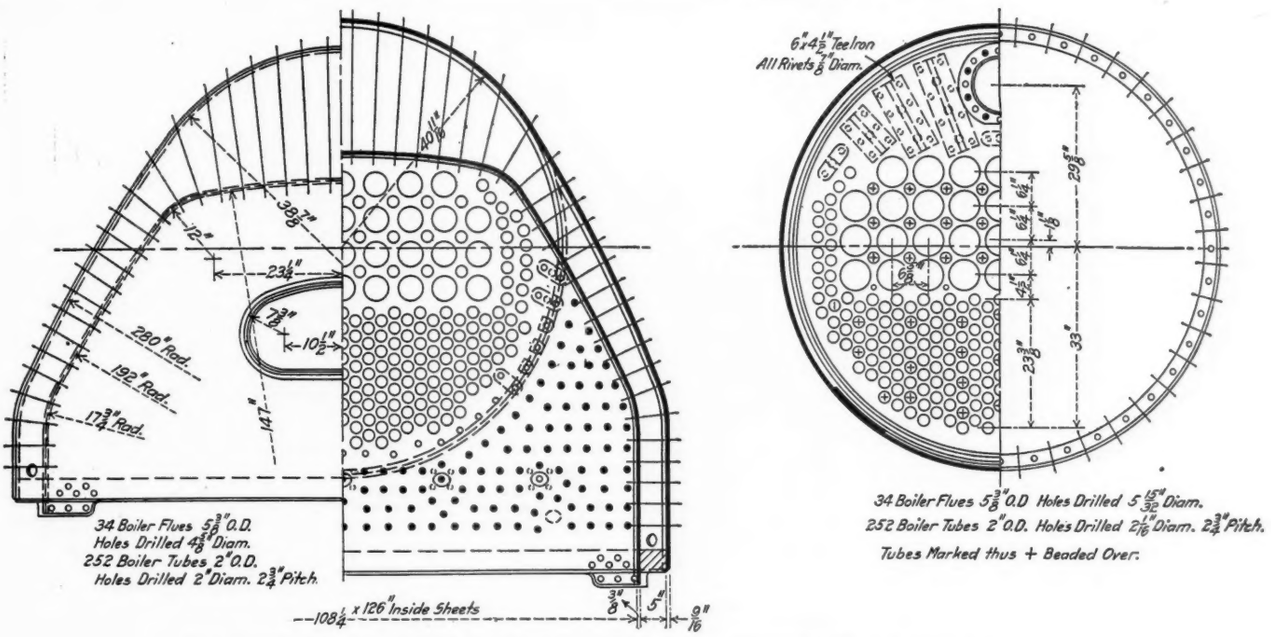
It is frequently necessary to run seven cars on the limited trains, making practically 380 tons behind the tender, and the ten-wheelers, if unassisted, invariably lose from five to seven minutes through the mountainous districts. It has, therefore, been made the rule to furnish helpers on all the fast trains.

The new locomotives are designed to handle eight cars over the mountains on the present fastest schedules. This rating is made on a saturated steam basis, and with the reserve boiler capacity secured with the use of highly superheated steam, it is expected that they will be able to make the schedules unassisted with nine cars, or 530 tons. The expense of double heading will thus be eliminated and at the same time the present high standard of service will be maintained.

Apart from size and power, the design is characterized by a number of new details which have been developed by the builders with a view of reducing the cost of maintenance. One of the most interesting of these is the long main driving boxes, which are designed to reduce the wear on the boxes and increase the mileage before the renewal of the bearings becomes necessary. These boxes provide a length of journal from 50 to 66 per cent. greater than is obtained with the usual construction, and a corresponding increase in the width of the shoe and wedge bearing. At the same time the spring load is transferred equally to all portions of the driving box, and the frames and spring rigging are retained in their normal transverse centers. The main driving box has a journal 21 in. long and a shoe and wedge fit 16 in. wide, and would seem the most effective step so far taken to overcome the tendency of the increased horizontal forces, set up in the modern powerful locomotive, to produce rapid wear and lost motion in the driving journals, necessitating the frequent renewal of the bearings.

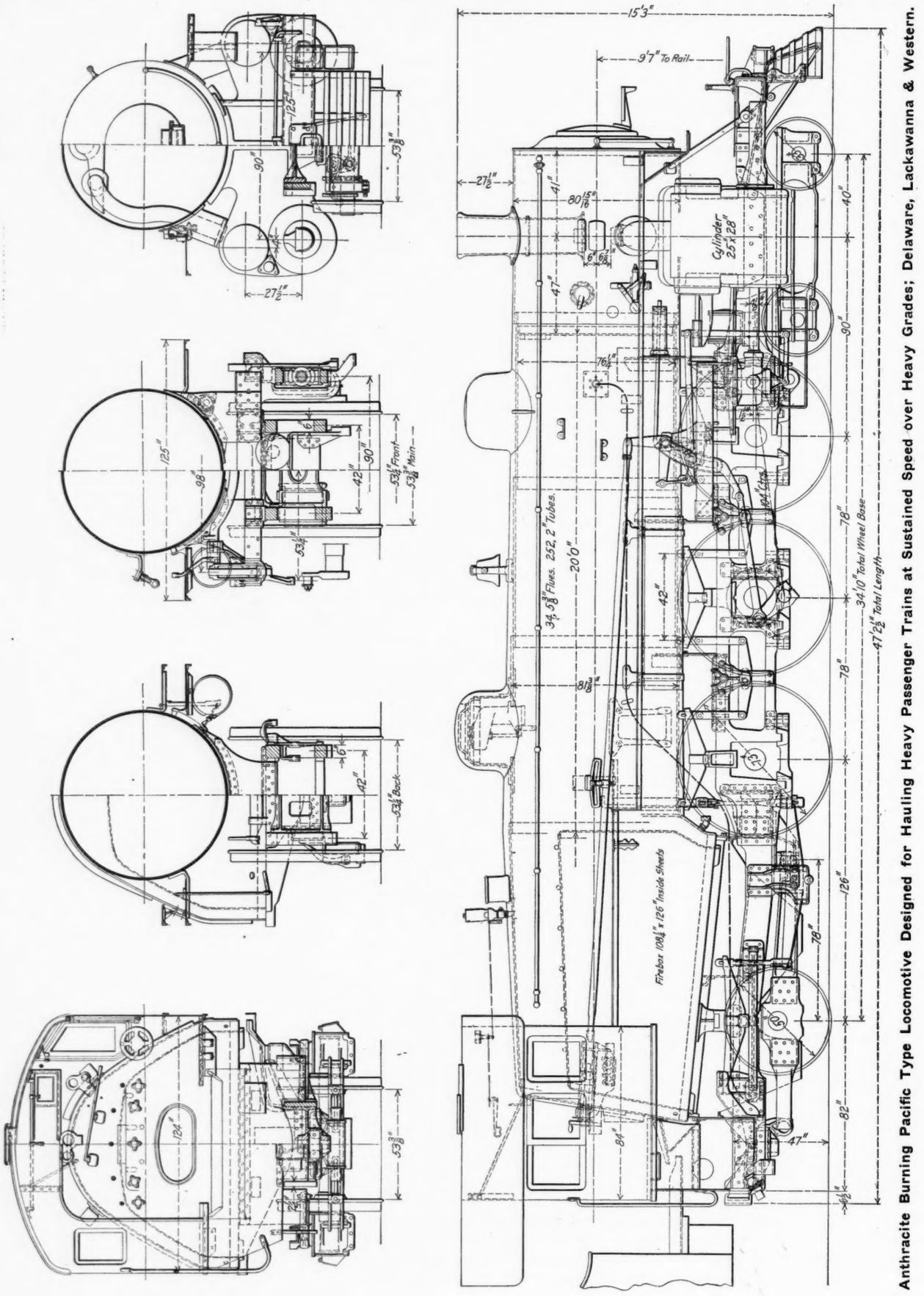


Boiler for Lackawanna Anthracite Burning Pacific Type Locomotive.



End Elevations and Sections Through Boiler for Lackawanna Pacific Type Locomotive.

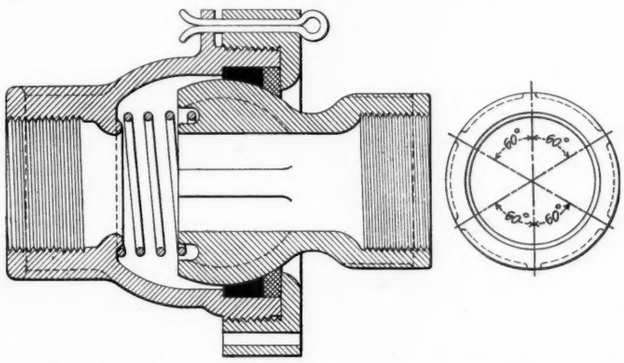
The main driving boxes of this design have been applied to two Pacific type locomotives on the New York Central & Hudson River with satisfactory results. Heretofore, driving boxes have generally been designed with reference only to the weight they support and the size has been in direct proportion to the load borne by each journal. In the large locomotive of today, the transverse spacing from center to center of the cylinders has necessarily been increased. At the same time the distances between the frame centers have been decreased to obtain as long a driving box as possible within the limitation of the spacing between hubs imposed by the 4 ft. 8½ in. standard



Anthracite Burning Pacific Type Locomotive Designed for Hauling Heavy Passenger Trains at Sustained Speed over Heavy Grades; Delaware, Lackawanna & Western.

gage. As a result, the horizontal forces have increased in greater proportion than the load on the journals. This results in a rapid accumulation of lost motion causing pounding and requiring a renewal of driving box bearings after much less mileage than heretofore.

Previous efforts to solve the problem have consisted chiefly in increasing the width of the shoes and wedges by making the legs of the pedestals wider than the body of the frame. This made a lop-sided construction, and resulted in the uneven wear of the bearing and conical wear on the journals. With the new box the normal width of the frames at the main pedestals is increased by means of auxiliary pedestals on the inside of the frames combined to form a continuous cross-brace. The width of the shoe and wedge fit is increased by an amount equal to the width of the supplementary pedestal, or that portion of the shoe and wedge bearing formed at each end of the cross-brace which is inside of the frame. The spring load is transferred equally to the center of the box, without disturbing the spring rigging from its normal position in the center of the frames, by a combination spring saddle extending across the engine. Spring seats are formed in the overhanging ends of the saddle, which in turn are supported by downward extending legs which bear on the centers of the boxes. The spring centers are 42 in. apart, while the centers of the legs of the spring saddles are 34 in. apart. The two cross-braces are tied together top and bottom



Franklin Ball Joint Used on Steam and Air Pipes Between Engine and Tender.

by supplementing pedestal caps inside of the frames. The necessary length of journal is secured to insure against rapid wear, and the spring supported load is transferred equally to all portions of the driving box without any complications in the design of the frames or the arrangement of the spring rigging.

Another new feature of design is the adjustable thrust collars fitted to the leading truck axles on the inside of each box. These serve to distribute the lateral thrust and reduce the wear on the wheel hubs and boxes. Each thrust collar is made in two halves, bolted together, and fits against a shoulder on the axle. Lateral wear may be easily taken up by babbitting the face of the thrust collar. To provide for the easy removal of the oil cellars, the truck pedestal caps are made in the form of links held in place by finished pins and fitted with cotter keys. Thus, by simply dropping the pedestal cap link, the cellar can be taken out from the bottom.

A screw reverse gear is used similar to the one on the experimental locomotive No. 50,000. It has been improved by the use of a ball joint connection between the reach rod and the screw gear crosshead. This obviates the necessity, under ordinary conditions, of offsetting the reach rod to connect to the reverse shaft arm.

The firebox of one of the locomotives is equipped with a Security brick arch and the boilers of the other locomotives are so designed that the arch can be applied later, if desired. This is the first instance of the application of this device to hard coal burning engines and the results will be watched with interest.

A somewhat different construction of the back tube sheet and throat sheet from the ordinary practice in a hard coal burning firebox has also been employed. The back tube is made in one piece and the throat sheet is sloped. Ordinarily the tube sheet in fireboxes of similar construction is made in two pieces, and a straight throat is employed. The boiler is equipped with a superheater of the top-header, double loop type, giving a superheating surface of 821 sq. ft., figured on the basis of the inside diameter of the superheater tubes. Other special features include the Franklin automatic door opening device. The width of the fire door required a special construction which consists of two vertical doors carried in a single frame and operated by independent cylinders and foot pedals.

The Walschaert valve gear is arranged to give a variable lead; a maximum cut-off in starting is provided with the proper amount of lead at the ordinary running cut-off. It gives a satisfactory steam distribution for high duty service. This practice has been used by the builders in a number of recent designs. The favorable results for starting in full forward gear are, however, obtained at the expense of distortion of the valve events in back motion. For this reason, the practice is suitable for passenger and fast freight locomotives, but not for slow freight or switching locomotives. The eccentric crank is given an angle of advance of less than 90 deg. It thus lags behind its correct position for constant lead and the link is not in its central position when the crank pin is on the center. With the eccentric crank so set, the lead increases from full forward to full back gear.

A new arrangement of flexible connections employing ball joints is used between the engine and the tender for the steam and air pipes and was furnished by the Franklin Railway Supply Company. The frames are of vanadium steel. The principal dimensions of these locomotives are given in the following table.

General Data.

Gage	4 ft. 8½ in.
Service	Passenger
Fuel	Anthracite coal
Tractive effort	40,800 lbs.
Weight in working order	284,000 lbs.
Weight on drivers	179,500 lbs.
Weight of engine and tender in working order	443,600 lbs.
Wheel base, driving	13 ft.
Wheel base, total	34 ft. 10 in.
Wheel base, engine and tender	69 ft.

Wheels.

Driving, diameter over tires	73 in.
Driving, thickness of tires	3½ in.
Driving journals, main, diameter and length	11 in. x 21 in.
Driving journals, others, diameter and length	10½ in. x 13 in.
Engine truck wheels, diameter	33 in.
Engine truck journals	6½ in. x 12 in.
Trailing truck wheels, diameter	50 in.
Trailing truck journals	9 in. x 14 in.

Cylinders.

Kind	Simple
Diameter and stroke	25 in. x 28 in.

Valves.

Kind	Piston valve
Diameter	14 in.

Boiler.

Style	Straight
Working pressure	200 lbs.
Outside diameter of first ring	78 in.
Firebox, length and width	126 in. x 108¼ in.
Firebox plates, thickness	⅜ and ½ in.
Firebox, water space	F.—6 in.; S. & B.—5 in.
Tubes, number and outside diameter	252—2 in.
Tubes, thickness	No. 11, B. W. G.
Flues, number and size	34—5⅜ in.
Flues, thickness	No. 9, B. W. G.
Tubes, length	20 ft.
Heating surface, tubes	3,579 sq. ft.
Heating surface, firebox	239 sq. ft.
Heating surface, total	3,818 sq. ft.
Superheater heating surface	821 sq. ft.
Grate area	94.8 sq. ft.

Tender.

Tank	Water bottom
Frame	Channels
Wheels, diameter	36 in.
Journals, diameter and length	6 in. x 11 in.
Water capacity	8,000 gals.
Coal capacity	14 tons

EFFECT OF WHEEL CONING ON SHARP FLANGES.

That the present standard wheel tread with the coning 1 in 20 is favorable to wheel service and prevents the rapid formation of sharp flanges, has been shown by the records kept by the Pennsylvania Railroad which are graphically illustrated in the accompanying diagrams. The standard coning 1 in 20 was adopted by the Master Car Builders' Association in 1907. Several years prior to that date the standard was 1 in 38, but with the introduction of high capacity cars the increase of flange failures became alarming. These failures were attributed by many to the action of heat from the brake shoe and from the rubbing of the flanges in passing curves. The more competent opinion, however, attributed them to the peening action of the rail in compressing the metal at the surface of the tread. This compression sets up tension stresses in the metal immediately below the surface, resulting in a cleavage of the white metal which extends around the circumference, causing the flange to drop off.

The increase in the coning of the wheels was made not so much to assist them in passing curves, but, rather, because coned wheels when mounted on an axle track laterally, whereas cylindric wheels practically run with one flange almost constantly against the rail, and a very slight difference in diameter will determine which rail is in contact. The wheel which runs against the rail constantly gets its wear on a comparatively small surface, whereas the flange and tread of coned wheels which run free from the rail have their wear distributed over a wider surface. The tendency of cylindric wheels to run against the rail is aggravated by any increase in the difference in diameter.

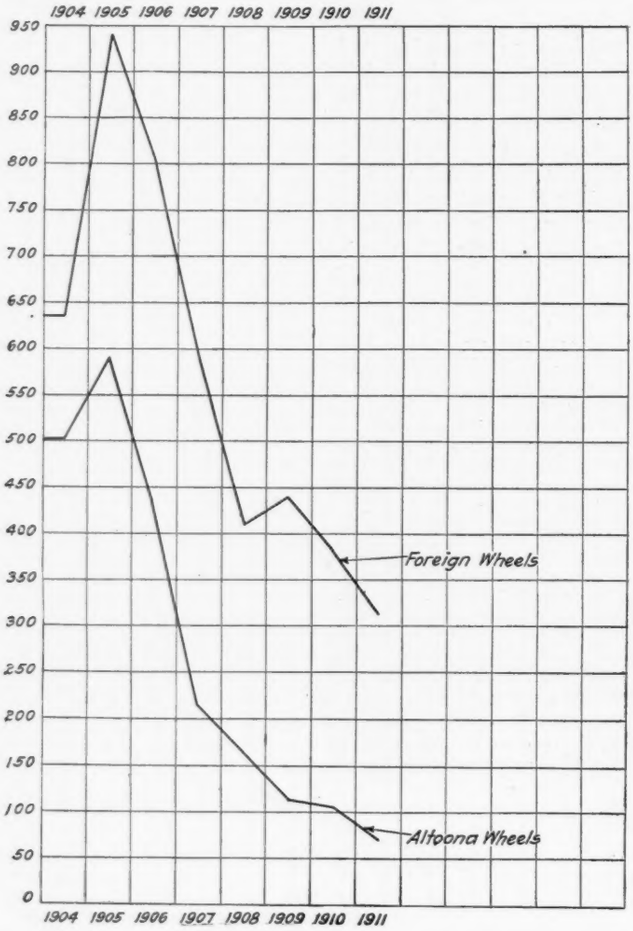


Fig. 1—Number of Cast Iron Wheels With Broken Flanges on the Pennsylvania Lines East of Pittsburgh and Erie from 1904 to 1911, Inclusive.

The diagrams present clear evidence of the fact that there has been a great diminution in the breakage of flanges since the adoption of the standard coning of 1 in 20. It is a striking proof of the wisdom of the change which was made in the standard in 1907 and should overcome any tendency to reduce the coning in order to prevent the supposed rail failures due to eccentric loading.

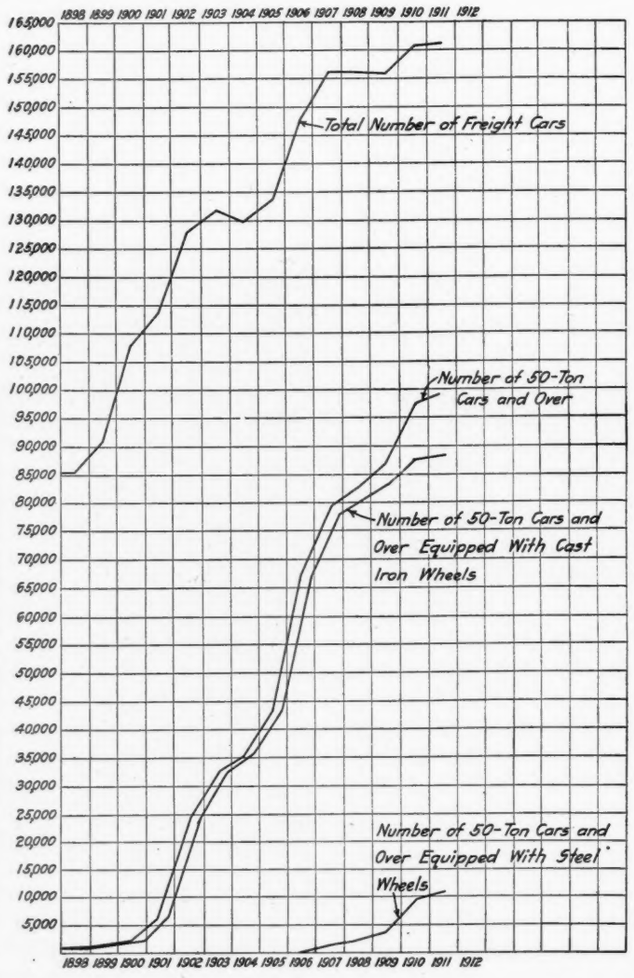


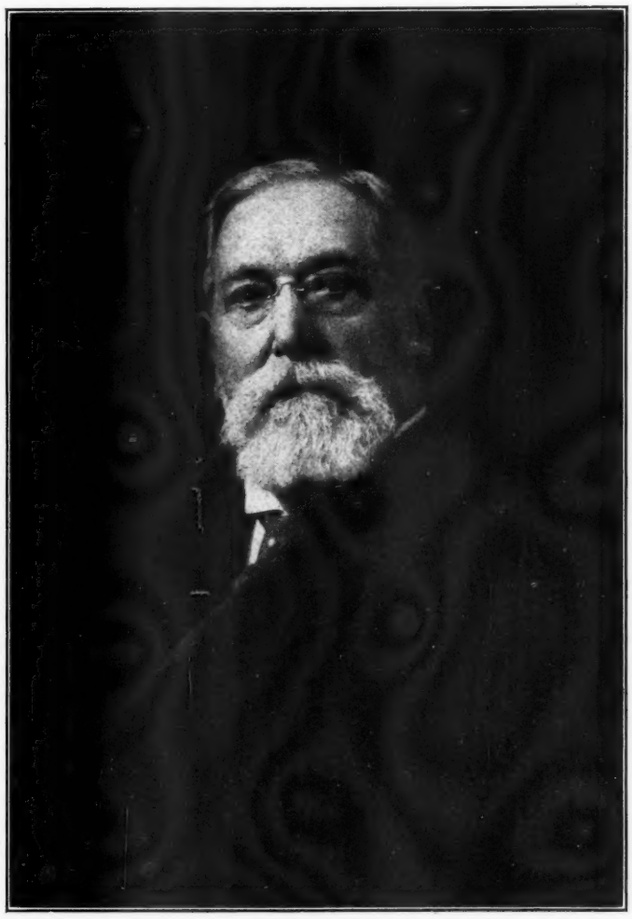
Fig. 2—Showing the Small Proportion of Steel Wheels on Pennsylvania Railroad Freight Cars.

It will be seen from Fig. 1 that in 1905 there were 950 broken flanges on foreign wheels and 600 broken flanges on Altoona wheels, or a total of 1,550 broken flanges on chilled iron wheels in freight service on the lines of the Pennsylvania Railroad east of Pittsburgh and Erie. In 1911 these figures had been reduced to only 325 broken flanges on foreign wheels and 75 on Altoona wheels, or a total of 400. The diagram in Fig. 2 shows the small proportion of steel wheels which have been in service on these lines of the Pennsylvania Railroad, so that they could not have had much influence on the favorable results here shown. This diagram shows that the total number of freight cars on the Pennsylvania lines East in 1911 reached 160,000; in 1905 only about 40,000 of the 50 tons cars and over were equipped with cast iron wheels, and in 1911 approximately 88,000 were equipped with cast iron wheels. In 1907 only about 2,000 50 ton cars were equipped with steel wheels, and in 1911 the number of cars thus equipped had increased to 11,000.

HENRY FINK.

Henry Fink, chairman of the board of directors of the Norfolk & Western, died July 15 at his apartments in New York. Mr. Fink had been confined to his rooms since December, 1911, suffering from heart and kidney trouble.

Mr. Fink had been chairman of the board of the Norfolk & Western since March, 1902. During the last few years his work had been largely that of an adviser, but an adviser with a wealth of experience and knowledge. While he did not follow details of operation, he never lost his deep interest in the broader questions of railway management, and, although an engineer, an operating man, and a reconstructor of financially and physically run-down properties, he had an unusually keen, clear insight into traffic questions and rate theories. He impressed one, in his later years especially, with the kindly breadth and scholarliness of his opinions, and with his frank tolerance of changes that were taking place in the attitude of the public toward the railways, and the new problems that were being raised for railway men to face. He remarked once that he "had always been with poor broken-down roads," and it would seem fitting and right that in his later life he should have been chairman of a company which he himself had helped to build up and put on its feet, and which now is so well known for its prosperity and dividend earning powers.



Henry Fink.

Mr. Fink was born in Germany in 1831, and was educated at the Polytechnic School at Darmstadt. He began railway work on the Western Maryland as rodman and transitman in 1851. He worked in the engineering departments of the Baltimore & Ohio and of the Norfolk & Petersburg, and later became superintendent of transportation of this road, which is now part of the Norfolk & Western.

In 1871 Mr. Fink became superintendent of transportation of the Atlantic, Mississippi & Ohio Railroad, holding that post five years. He was made receiver and general manager of the road in 1876, and resigned in 1881 to become second vice-president and general manager of the Norfolk & Western. In 1883 he was vice-president and general manager of the Norfolk & Western and the East Tennessee, Virginia & Georgia, and general manager of the Memphis & Charleston. He was general manager of the Virginia, Tennessee & Georgia Air Line from 1881 to 1888, and for one year, beginning in 1885, was receiver of the East Tennessee, Virginia & Georgia. He was vice-president of this road from 1886 until 1892.

All of his railway work was with southern roads. In 1887 he was vice-president of the Richmond & Danville, and in 1895 he was made one of the receivers of the Norfolk & Western, which, as it stands today, is a tribute to his scientific methods and ability.

Mr. Fink had a philosophical and analytical mind, and habits of patient study, which are shown in his contributions to the *Railway Age Gazette* and in his testimony before the Hadley securities commission. He had been receiver of roads six times, and the continuous struggle through financial difficulties developed a wisdom that was almost unique. He had qualities of judgment, foresight and firmness, which could have been developed only under the stress of hard times.

INFLUENCE OF SUPPLY DEPARTMENT MANAGEMENT ON OPERATING EXPENSES*.

BY GEORGE G. YEOMANS.

There are two things which are vital to the successful management of any business. The first is a proper organization, and the second is a proper method. Neither one can be wholly successful without the other, and the most perfect organization cannot do the most efficient work if it pursues inferior methods.

Applying these axioms to the management of a railway supply department, it is the purpose to show how great an influence the combination of proper organization and proper methods may exert upon the operating expenses of the railway.

In spite of all the attention that has been given to the administration of the supply department by railway officers in recent years, and of the great improvement that has been effected in the economical handling of material, it is still true that there are almost as many different methods employed in handling and accounting for material as there are different railways, and this lack of uniformity, to some extent, impedes more rapid progress in the development of a perfect system. This is because each management considers its methods the best; in fact, that is the reason they were adopted; and it is difficult for the management to believe there can be anything better.

It is only necessary to reflect that all these methods can not be the best, in order to be sure that there is still room for improvement.

In reality, the best method of supply department management consists in selecting and using the best features of all of the different methods, and discarding the poorer ones; and it is the results which have been accomplished under such a system that form the basis for this article.

So much has been said and written about scientific management in the last few years that it seems to be about time for practical management to have its innings; and the following paragraphs are simply a plain statement of the extent to which operating expenses were actually effected, under every-day operating conditions, on an ordinary railway, by the application of practical, com-

*In an article in the *Railway Age Gazette*, June 21, 1912, Mr. Yeomans discussed "The Fundamental Principles of Railway Storekeeping."

mon sense methods to the management of the supply department.

The figures which are used to illustrate these results are taken, by permission, from the records of a railway company, the management of which effected a reorganization of its supply department at the beginning of the fiscal year 1905-6 and introduced the use of more exact methods of practical management in its operations. These figures tell their own story so plainly that extended comment is unnecessary, but to those desirous of analyzing them closely a few words of explanation are desirable.

First, the figures which refer directly to material, embrace only the supplies for which the chief supply officer can be held solely responsible. They do not include those items which are beyond his control, such as ballast, bridges and fabricated structural steel, rail, both new and second hand, cross ties, new rolling stock, locomotive fuel and scrap. They do include stationery, switch and bridge ties and all other material of every nature owned by the company, *wherever located,* and, in addition to the so-called storehouse stocks, they embrace the "working stocks" of material necessarily carried at various shops, freight car repair tracks, and engine terminals for daily consumption, as well as the "emergency stocks" of maintenance material which should be always ready for instant use at strategic points on each division.

Second. The amount of money expended in the purchase of material each year is chosen as a measure of efficiency for obvious reasons. (1) It represents results in real money expended. (2) With the elimination of rail, ties, bridges, etc., its intimate relation to actual expense of operation can not be questioned. (3) It reflects most accurately the conservation of material made possible by the concentration of responsibility for the purchase, custody and distribution in the hands of an organization devoted solely to that purpose. (4) It illustrates the possible money value of intelligent supervision of the supply department, and helps to answer the question, "Will increased expense for better organization be profitable?"

Third. The figures showing the average monthly stock of material carried are introduced to show that when the correct principles of railway storekeeping are known and applied, the necessity for a large stock of material vanishes. It stands to reason that if the practical operation of the road had been seriously impeded through any lack of material, theoretical methods would have gone by the board in a hurry. Incidentally, the facts show that during the last two years of the period the management had over half a million dollars, which was formerly invested in material, to devote to other purposes. This was more that 45 per cent. of the original investment in material.

Fourth. The figures representing the cost of the service do not include the expense of the chief supply officer and his office force, which consisted of two clerks. They do include all other expense connected in any way with the purchase, custody and distribution of material except the actual labor of handling locomotive coal through the coal chutes and delivering it on the tenders, and the cost of transporting company material over the line in the work of distribution. They justify the expenditure of any reasonable amount for adequate supervision.

Fiscal years ending June 30.	Total operating expenses.	Purchases of material.	Average monthly stock of material.	Average monthly cost of service.
1905	$20,503,445	$2,632,991	$1,142,019*	$11,436*
1906	18,077,887	1,132,776	949,414	9,413
1907	19,505,147	2,062,178	893,179	12,130
1908	18,843,748	1,916,667	888,345	12,088
1909	18,757,184	1,818,396	616,637	10,816
1910	20,536,223	2,363,801	602,409	12,152
Average for five years..	$19,144,038	$1,858,763	$789,997	$11,320
Average annual decrease.	$1,359,407	$774,228	$107,922	$116

*The records for the year 1905 were not sufficiently accurate to be used as a basis for computing the *average* monthly results for that year. The figures given are those for the last month of the year, which were definitely ascertained.

It will be noted that during this five-year period the management of the supply department alone was responsible for more than one-half of the average annual decrease which it was found possible to make in the operating expenses of the road, and this without any inference to rail or tie renewals, where large temporary savings are sometimes effected.

During this period, also, the business of the railway was showing a fairly constant and steady increase as compared with the year 1904-5, necessarily involving an increase in the amount of material consumed in operation and maintenance.

The following figures are introduced to show the annual *percentage* of increase of those items of operation which afford an index to the amount of material required for use:

Year.	Number locomotives.	Tractive power.	Number frt. cars.	Ton mileage.	Car mileage density.
1906	1.2*	0.8*	1.1*	23.7	10.6
1907	7.0	20.5	26.5	39.1	14.9
1908	15.0	39.4	23.2	26.2	14.4
1909	13.0	32.9	21.7	24.5	18.5
1910	12.9	32,8	14.8	39.5	23.3
Average annual increase	9.3	24.9	16.1	30.6	16.4

*Decrease.

The mileage operated did not change. The track mileage increased 2.3 per cent.

The figures representing the average monthly stock of material are especially interesting as showing the time necessarily consumed in adapting existing conditions to new methods. The inertia of a large and widely scattered organization is tremendous, and the introduction of any radical changes in procedure is a slow and tedious process. An immense amount of educational work has to be done in advance, and the changes must be made very gradually. It will be seen, for example, that the reduction of the stock of material proceeded very slowly for the first three years, the average annual reduction being only $84,558, or 7.4 per cent. During the two succeeding years, after the operating officers became more accustomed to the change of method, and had learned by experience that it was not affecting their operations injuriously, progress was more rapid, and the average annual decrease was $142,968, or 16 per cent., until the limit of a safe working margin was reached.

It may be stated at this point that when the operations of the road were first carefully analyzed, with reference to the actual consumption of material, it was predetermined that an average monthly stock of material not exceeding in value $650,000 should be sufficient to supply all of the normal requirements of the road under the existing operating conditions.

Nothing at all has been said about the minor and incidental savings which accrued to the company through the operations of the supply department, because it is not desired to confuse the mind with a multiplicity of figures, or to introduce what may be termed negative advantages, along with the positive benefits; but they are present, nevertheless, and on close inspection might, perhaps, be found to represent additional savings aggregating about $50,000 per annum. They are unnecessary to prove the extent to which correct supply department management may, in some cases, influence operating expenses.

The whole benefit of this analysis will be lost unless the main point is fully grasped, and the *main point* is this: In the year 1904-5 the management was in exactly the same position with respect to the supply department as the average railway. It had an organization and was following the methods which were considered efficient and entirely satisfactory. The results which the monthly reports disclosed were thought to be representative of the best that could be done under the "local conditions" which prevailed, and any very marked improvement through any change in existing methods was considered problematical, to say the least.

While it is not to be presumed that precisely similar results could be reached on every railway, it is evident that the management of the supply department can be made to play an important part in the operating expenses of a railway.

Railways are projected in Argentina as follows: From Tres Arboles to Piedra Sola, 36 miles, from Paloma via Roche to Treinta y Tres, 108 miles; and from San Carlos to Rocha, 45 miles.

THE RAILWAYS AND THE PANAMA CANAL.

Argument Over Toll Question. Discriminatory Effect of Free Toll Policy. Proposed Restrictions on Vessel Ownership.

There is probably as much ignorant talk at present about the Panama canal and the various interesting questions raised by its approaching completion as about any other subject. It every member of Congress would familiarize himself with the testimony introduced at the hearings on the canal before the committee on interstate and foreign commerce of the House of Representatives, and would act as the facts presented dictate and the impartial experts who testified recommended, a measure would be adopted which would do justice to all directly concerned, and be beneficial to the public, which indirectly is the most concerned.

The construction of the canal was determined on for both military and commercial reasons. The need for it from a military point of view was accentuated during the war with Spain, when the battleship Oregon when on the Pacific coast was greatly needed on the Atlantic, and had to go clear around South America to get there. The original estimates of its cost have been greatly exceeded by the figures for actual construction. It is now officially estimated that the total cost will be $375,000,000. It is also officially estimated that the annual cost of maintenance and operation will be $4,000,000. This includes nothing for the maintenance of the civil government, but is only for the canal plant itself. There have thus far been issued $84,631,980 of canal bonds, which may be used as security for national bank notes and which, therefore, bear only 2 per cent. interest, and $50,000,000 of Panama canal bonds, which bear interest at 3 per cent. To cover the total expenditure of $375,000,000 there remain to be issued $240,368,020 in bonds, which doubtless will bear interest at 3 per cent. The total interest on this basis will be $10,403,680 per year, which, added to an expenditure for maintenance and operation of $4,000,000 per year, and allowing nothing for sinking fund, would make $14,403,680 per annum.

The recent discussions of the canal have centered around the question of whether, and if so what, tolls should be imposed on vessels using it, and what restriction, if any, should be put on its use by boats owned or controlled by the railways. The House committee on interstate and foreign commerce having 21 members, made both majority and minority reports. The majority, composed of 16 members, recommended authorizing the President to fix tolls on ships of commerce which should not exceed $1.25 per ton, based on net registered tonnage, and which should not, together with the tolls on war ships and passengers, be less than the estimated cost of maintenance and operation. The toll for each passenger should not be less than $1.50; and the tolls on warships should be in proportion to that on merchant vessels. The majority also recommended a provision making it unlawful for any interstate railway to have any interest whatsoever, directly or indirectly, in any common carrier by water with which the railway does or may compete. This would have applied not only to carriers using and competing with those using the canal, but would have prohibited any railway from owning any interest in any water carrier in the United States with which it does or might compete.

A minority of five members of the committee opposed the imposition of any tolls on vessels engaged in the coastwise trade. It is, perhaps, not without significance that of these one was from Louisiana, two from New York and one from California. The bill passed by the House provided that no tolls should be levied on coastwise vessels. The committee on interoceanic canals of the Senate has gone a step farther and recommended also that no tolls be levied on vessels of American registry engaged in foreign trade whose owners will agree that such vessels may be taken and used by the United States in time of war or other public emergency. It also recommends that no boat owned, chartered, operated or controlled by a railway company, or in which any railway company has any interest, shall be permitted to enter or pass through the Panama canal while engaged in coastwise trade between ports of the United States.

THE TOLL QUESTION.

Estimates as to the amount of business that will be handled by the canal vary widely. Its chief competitor for transoceanic business will be the Suez canal. Its competitors between the two coasts of the United States will be the transcontinental railways. Some have expressed the opinion that in any event it will find it hard to compete with the Suez canal and the transcontinental railways, and that, commercially, it will be a failure. A very different view is that of Professor Emory R. Johnson of the University of Pennsylvania, who formerly was a member of the Isthmian Canal Commission, and who was employed by the present national administration to study the questions of Panama canal traffic, tolls and measurements of vessels. Based on an elaborate investigation, Dr. Johnson, in his testimony before the House committee, expressed the opinion that in 1915, when the canal will be opened, there will be available for using it 10,500,000 net registered tons of vessel capacity, of which 1,160,000 net tons will be engaged in the coastwise trade. It should be noted in this connection that the proposed tolls would be levied on the net registered tonnage of vessels, and not on the freight traffic passing through the canal. This statement would seem superfluous but for the fact that some persons have discussed the matter on the theory that the tolls would be levied on the traffic. A registered ton is 100 cu. ft. of vessel capacity, and is ordinarily equivalent to two and one-half tons of freight. Therefore, a proposal to levy a toll of $1.25 a net registered ton is substantially equivalent to a proposal to levy a toll of 50 cents on each freight ton, assuming the vessel loaded to its capacity. Professor Johnson's estimate of the amount of transoceanic business that will use the canal was based on various factors, including the relative distances, the costs of fuel, and the opportunities for getting traffic, by various routes. His estimate of the future coast to coast business was based both on calculations as to the past and present freight movement by water and rail betweeen the two coasts and on the vessel tonnage handling the water traffic. Testimony introduced in the hearings of the long and short haul cases before the Interstate Commerce Commission indicated that the total coast to coast movement of freight traffic by both water and rail was, according to the latest available statistics, about 3,000,000 tons. Based on the growth in past years, Professor Johnson thought this would increase to 4,200,000 or 4,500,000 tons by 1915. He estimated the vessel tonnage using the Panama route in 1910 at 418,000 tons net register, that using the Tehuantepec route at 363,426 tons net, and that using the Straits of Magellan route at 172,655 tons net, a total of about 950,000 tons net. He thought this would increase by 1915 to the figure already given, 1,160,000 tons net. He evidently believed that about one-half of the transcontinental freight should be handled in coastwise vessels, although he declined to commit himself on this point. Dr. Johnson did not recommend in his testimony what toll should be levied, but he did say that Congress would be perfectly safe in authorizing the President to impose a toll of not more than $1.50 a net ton.

If Dr. Johnson's estimates can be accepted, it is evident that tolls can be imposed that will yield enough revenue to pay the interest on the canal debt and the cost of maintenance and operation. A toll of $1.50 would yield over $15,000,000 a year, and the government's maximum estimate of the interest charges and maintenance and operating expenses is $14,403,680. A toll of $1.25 would yield over $12,500,000. There will be, besides,

if any of the bills thus far introduced pass, tolls from passengers and warships.

TOLLS AND THE MERCHANT MARINE.

Now, the interest on the debt and the cost of maintenance and operation must be paid either by those using the canal or by the taxpayers of the United States. Few will contend that tolls should not be levied on foreign vessels carrying foreign goods between foreign ports, or foreign vessels carrying American goods between American and foreign ports. It is argued, however, that tolls should be remitted in the case of American vessels engaged in the foreign and coastwise trades, in the case of the former to encourage the development of an American merchant marine, and in the case of the latter to further this object, and also to cheapen transportation between the coasts and stimulate competition with the transcontinental railways. Disregarding the question of whether levying tolls on foreign vessels and refraining from doing so in the case of American ships would violate our treaty obligations, it is clear that allowing American vessels engaged in transoceanic business to use the canal toll free would simply be to grant a ship subsidy in one form, and whether that is desirable or not must be determined in precisely the same way as the desirability of any other form of ship subsidy.

With respect to coastwise vessels there is no necessity of subsidizing them to enable them to compete with foreign vessels, for the very good and sufficient reason that the navigation laws give American vessels an absolute monopoly of the coastwise trade. The result has been, contrary to popular beliefs, a steady and large growth in our merchant marine. In 1891 the gross tonnage employed in the coastwise trade of the United States was 3,609,877 tons; ten years later, in 1901, it was 4,582,645 tons; and in 1911 it was 6,720,313 tons. This so much more than offset the decline in the part of the merchant marine engaged in foreign trade that the tonnage of our total merchant marine, engaged in both foreign and coastwise trade, increased from 4,684,759 gross tons in 1891 to 5,524,218 gross tons in 1901 and to 7,638,790 gross tons in 1911.

There are two ways of disproving of the contention that a toll free canal for coastwise ships is necessary to the development of the merchant marine. One is the mere citation of the foregoing figures. The other is to consider the changes in the coastwise trade that the opening of the Panama canal will make.

TOLLS AND COASTWISE TRAFFIC.

It is well known that for some years there has been a steady and rapid growth of coast to coast water traffic. The vessels using both the Tehuantepec and the Panama routes have been able to make much lower rates than the competing railways, in spite of the fact that traffic moving via the Tehuantepec and the Panama routes has had to be trans-shipped across the isthmus by rail. George S. Dearborn, president of the American-Hawaiian Steamship Company, stated in his testimony before the House committee that his company paid the Tehuantepec railway for making this transfer $3 for each ton of freight. Furthermore, incidental to the transfer the steamship company is put to some other expenses, which, however, may be dismissed from consideration here. When the canal is opened the American-Hawaiian Steamship Company will both be able to give faster and better service and be relieved of the cost of this transfer by rail. Suppose, now, that a toll of $1.25 per net registered ton were imposed on its vessels. If it carried only two tons of freight per net registered ton the toll would amount to but 62½ cents per freight ton handled by it, which would leave a clear saving of $2.37½ for every ton of freight that it handled. If it were able to load its vessels fully the toll for each ton of freight would be only 50 cents, and the net saving to the steamship company as a result of the construction of the canal would be $2.50 for each freight ton handled. It was with these facts in mind that Dr. Johnson said in his testimony before the House committee, "I suppose it will be agreed by everyone that a Panama toll equivalent to 50 or 60 cents per ton in ship cargo, on which the freight rate will average $10 per ton, will not be a high charge. . . . The advantage to the commerce of the United States, by relieving coastwise carriers of Panama canal tolls, would, in my judgment, be slight. First, I think the toll will be a comparatively light burden to be borne, and, second, *I think the burden such as it is will be borne by the steamship companies, whose rates may be expected to be adjusted with reference to the railway rates, and those will not be upon a ruinously low basis.* (The italics are ours.) From the point of view of American commerce, there is little, if anything, to be gained by relieving the coastwise carriers of the payment of reasonable tolls."

Mr. Dearborn, in his testimony, argued that tolls should not be imposed. But he admitted that a toll of $1 to $1.25 per net ton, or even more, would not interfere with the use of the canal by coastwise vessels. "If you are going on the lines of what the traffic will bear it would stand very much more," he said.

It may, therefore, be considered as demonstrated that freedom from tolls is not necessary to enable coastwise vessels to use the canal and to make rates very substantially lower than they make now. It is also very doubtful whether if no tolls were charged shippers or the consuming public would get the benefit of their remission.

It will be noted that Dr. Johnson said that if tolls were imposed he believed the burden of them would be borne by the steamship companies. This is simply stating the converse of the proposition that if no tolls be imposed, the result will be the saving of the amount of just so much to the steamship companies and not to the shipper or to the consuming public. That the benefit of a no-toll policy would not go to the shippers was the conclusion of the majority of the House committee, which said in its report, "When we go to voting away the government's money and credit to special interests, we prefer some method more fair and equitable. This small shipping interest has secured endorsements and recommendations from some trade organizations in various coast cities of the country on the erroneous theory that shippers would secure the benefits of the remitted tolls through reduced freight rates. This is a delusion, pure and simple."

DISCRIMINATIONS BETWEEN SHIPPERS AND SECTIONS.

Suppose, however, the benefits of the remitted tolls were all passed along to the shippers in the form of reductions in freight rates. Even then, would the effect, from the national point of view, be desirable? Heretofore the shippers on the coasts, because of their access to water transportation, have enjoyed an advantage over shippers in the interior. The government by building the canal will increase this advantage—or, at least, make possible an increase in it. As has been shown, even if the coastwise vessels have to pay tolls for using the canal they will be able to make rates on transcontinental freight at least $2.50 a ton lower by reason of the construction of the canal than they have been able to heretofore. To refrain from levying tolls will be, if the benefit accrues to the shipper, to increase just to that extent the advantage which the coast shipper is given over the shipper in the interior. In other words, all of the people of the country, including those of the interior, would be taxed to pay the interest charges and maintenance and operating expenses of the canal in order to give the shipper on the coast a further advantage over his competitor in the interior.

In the past the transcontinental railways have sought to hold their share of the business moving to the Pacific coast, and at the same time secure to the shippers of the middle west their share of business on the Pacific coast, by making rates from New York to the coast which would enable the railways to compete with the steamship lines, and at the same time making rates to the Pacific coast from all points east of the Missouri

river as low as those from the Atlantic seaboard. It is contended that if the tolls on coastwise vessels were remitted, this would enable them to compete much more effectively with the transcontinental railways, and thereby force further reductions in the railway rates. But is it not worth considering whether the effect might not be to so reduce the rates of the railways as to make them unremunerative? Or has the sense of fairness of the American people been so deadened by agitation against the railways that they have come to believe that any and every reduction in railway rates, however secured, and whether reasonable or not, is proper and desirable? The interest on the investment in the canal and the cost of its maintenance and operation will be just as much parts of the cost of transportation via the canal as the interest and dividends on the investment in railway roadway and structures, and the expense of maintaining them, are parts of the cost of transportation by rail. It is as absolutely essential, if water transportation is to be carried on, that these expenses shall be paid by someone, as it is that the analogous expenses of rail transportation shall be paid by someone. No one questions that the someone who ought to pay these expenses of rail transportation is the shipper or traveler for whose benefit they are incurred. On what theory of equity or common sense, then, can it be contended that in order to reduce railway rates a large part of the expense of water transportation should be paid, not by those for whose benefit the waterway is used, but by the public? This is precisely on all fours with an argument that the government should build railway terminals, roadway and stations and maintain them, and permit the railway companies to operate trains and haul passengers and freight over them for nothing. All of the self-seeking, tax-eating sophistry that can be advanced by those who want the government to pay part of the expenses of furnishing water transportation or part of their freight bills cannot change the facts one iota. For the government to subsidize water transportation for the purpose of compelling reductions in railway rates regardless of their reasonableness is immoral. It is in its essence simply the taking of the money of the taxpayers to present it either to steamship companies or to those who ship by boats with the possibilities of impairing the integrity of the investments of those who have put their money into railways. If any reader thinks this language too strong, let him read the following from the report made by sixteen of the twenty-one members of the House committee on interstate and foreign commerce:

"The demand for discrimination in favor of American ships presents a square issue between a small fraction of the coastwise shipping interests and the entire population of the United States. The question, which our committee decides in the negative, practically and substantially stated is, Shall we, as representatives of the people, take from them without consideration, return, or recompense, their money and give it to the small special interests operating but a small per cent. of the coastwise trade, who have no right to the money, and do not need it, as their business is prosperous?"

RAILWAY RATE REGULATION AND WATER COMPETITION.

However, it is questionable, under the present interstate commerce law, as the Interstate Commerce Commission is seeking to administer it, whether the railways can so adjust their rates as to enable the shippers of the middle west to compete with those on the Atlantic seaboard for business on the Pacific coast, however much the roads may be disposed to. Acting under the amended long and short haul clause, the commission has ordered that railway rates from the Missouri river to the intermountain communities shall be made no higher than to the Pacific coast, that from Chicago to the intermountain communities they shall be made no more than 7 per cent. higher; from Pittsburgh no more than 15 per cent. higher, and from the Atlantic seaboard no more than 25 per cent. higher. In other words, the commisison seeks to require them to base their rates to all intermediate points on their rates to the Pacific. Under this arrangement every reduction made to the coast to meet water competition would have to be accompanied by corresponding reductions in the rates to intermediate points. The rates to the coast are comparatively unremunerative now, and the roads probably would lose more by reducing all of their rates in obedience to water competition than by maintaining them all, ceasing to meet water competition on the coast and giving up the competitive coast business to the boats. Thus the shippers of the middle west would be put at a disadvantage compared with their eastern competitors by the opening of the canal and would gain no compensating reduction in railway rates.

Some persons say, however, that the shippers of the middle west will be able to send their goods via the proposed lakes-to-the-gulf deep waterway and the canal. This is a dream. For conclusive reasons often stated, no lake or ocean vessel will ever use the proposed deep waterway no matter how deep it may be dug. It can never be made fit for navigation except by shallow vessels and barges. Now, there is at present a channel of not less than 9 ft. in the Ohio and Mississippi rivers from Pittsburgh to New Orleans, which is ample for large traffic. Why do not the shippers of Pittsburgh ship their iron and steel products and other goods via the Ohio and the Mississippi and the ocean to San Francisco? It may be replied that now they would have to be transferred by rail across the Isthmus of Tehuantepec or the Isthmus of Panama. But as the goods are shipped now they go by rail to New York, are transferred there to the boats, go thence to the Isthmus of Tehuantepec or the Isthmus of Panama, where they are transferred to a railway, and are then transported across the isthmus, where they are transferred to boats again. When the canal is opened it will reduce the number of transfers and the cost of transportation on the goods moving to New York and thence around by ocean just as much as it will the number of transfers that would have to be made in moving via the Ohio-Mississippi route. The fact that there is no movement of traffic from Pittsburgh by water is very strong evidence that there never will be any from Chicago by the Mississippi valley. No one can anticipate all the changes in industrial and transportation conditions that may occur, but it is a safe prediction that for many years to come the vast majority of the goods moving from the middle west to the Pacific coast will either go there direct by rail or by rail to New York and thence by water; and via either route the middle western shipper will be at a disadvantage compared with his eastern competitor, which a free-toll policy and the rate-making policy of the Interstate Commerce Commission would both tend to increase.

THE CANAL AND RAILWAY-CONTROLLED BOATS.

The second part of the program of those who are zealous to make the steamship lines using the canal the most effective competitors possible with the transcontinental railways is to restrict or prohibit the use of the canal by vessels in which railways have an interest. They argue that if railway-owned or controlled vessels are admitted to the coastwise trade via the canal, backed by the formidable financial resources of the railways, they will at first make such low rates as to drive out independent boat lines and then raise their rates. It is said that the money trust which is supposed to control the railways and which, therefore, wants nothing done that will injure them, already has refused to finance a steamship line being promoted by Bernard N. Baker of Baltimore.

Mr. Baker has complained loudly because he could not find anyone in Wall street who would back him. George S. Dearborn, president of the American-Hawaiian Steamship Comnay, in his testimony before the House committee, expressed the opinion that the real reason why Mr. Baker was unable to raise the capital was that his project was "most impracticable," "because the ships are passenger ships with very little freight space as compared to the size of the ships." "The Baker ships did not have capacity enough to make it a business proposition?" asked Representative Stevens. "No," Mr. Dearborn replied. In other words, the most experienced and successful steamship man handling coast to coast business

thought the real reason why the "money trust" would not advance money to Mr. Baker was not railway influence, but that those having capital did not think they would get any return on the investment. Certainly a "money trust" that won't advance money to anybody who wants it regardless of whether there is a chance of getting it back or not is a vicious combination!

As to the proposition to absolutely close the canal to railway-controlled vessels, it is questionable if it could be strictly enforced, and, even if it could be it would not prevent the same persons who are influential in railways from owning competing steamships. No law, for example, can prohibit the large stockholders in the Southern Pacific from directly engaging in the steamship business if they like.

Furthermore, even if the canal were used only by entirely independent steamship lines that would not insure low water rates. Almost throughout the world rates on the ocean are regulated by combinations of steamship companies. It is quite probable that early in the game agreements would be made by the coastwise steamship companies to maintain rates that would be just enough lower than the railway rates to enable the steamship companies to get their share of the business. Dr. Johnson believed this would be the result, and, therefore, advocated opening the canal to all vessels of American registry, regardless of their ownership, and placing their rates and service under the jurisdiction of the Interstate Commerce Commission. Of course, the waterway enthusiasts oppose this. Their theory of the proper relations between railways and waterways is that the railways should be practically prohibited from competing with the boat lines and that the boat lines should be subsidized and left free from any legal restrictions whatever, in order to enable them to take the maximum of business away from the railways. Just why combining to maintain rates, the making of a different rate to one shipper than to another on the same commodity when hauled in the same boat, and the giving of rebates to favored shippers, are not wrong and should not be interfered with by law when done by steamship lines, while like practises by railways are wrong and should be dealt with by law like robbery and arson, is hard to understand. But this view is no more lacking in common sense than most of the views entertained and expressed by waterway enthusiasts.

The Société Ottomane du Chemin de Fer de Damascus, a French enterprise has a small railway system in Syria. It comprises the narrow-gage line Beirut—Damascus—Muzerib and the two standard gage lines from Rajah to Aleppo and from Homs to Tripolis. Of these, only the second is built under guarantee of the Turkish government. The line from Homs to Tripolis was opened for traffic on June 1, 1911.

A French company is planning to build a coast line from Tripolis, Syria, to connect with the Egyptian railways. This line would connect Tripolis, Beirut, Saida, Es-Sur, Akka, Haifa, Cesarea, Jaffa, Gaza and Port Said. In the latter place it would be in touch with the Egyptian lines. This railway would be important for foreign traffic, which increases yearly. For trade it would be of importance only so far that it would connect the small coast towns like Saida, Sur, Cesarea and Mainas, which are not touched by the vessels of the larger steamship companies, and would permit them to export more readily the products of their fertile back country. It would, however, be of great importance from the strategic point of view, as it would enable Turkey within a very short time to throw her entire land forces on the Egyptian border. The Societe Ottomane du Chemin de Fer de Damas-Hamah et Prolongements, which plans to build this line, is a successful company; and the lines of its system have up to date paid well in every respect. Even the Hedja line has not been able to injure its parallel, the Damas-Muzerib railway. Its receipts increase yearly, and it is not impossible that its negotiations with the Ottoman government will lead to a profitable result for the company.

TRAIN ACCIDENTS IN JUNE[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of June, 1912:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd.
3.	Seaboard	Raleigh.	bc.	P. & F.	1	2
4.	N. Y. Susq. & W.	Macopin Lake.	bc.	P. & F.	1	6
14.	Cent. Ga.	Everett.	xc	P. & F.	1	12
22.	N. Y. Chic. & St. L.	Crayton.	rc.	F. & F.	2	4

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of Train.	Kil'd.	Inj'd.
3.	Kansas C. So.	Blanchard.	def. eq.	F.	3	5
3.	Cent. Ga.	McIntyre.	d. track.	P.	0	7
†11.	West. & Atl.	Dalton, Ga.	unx.	P.	3	66
16.	N. Y. Central	Tribes Hill.	acc. obst.	P.	1	0
26.	Chi. & E. I.	Martinton.	acc. obst.	P.	1	20

The collision near Raleigh, N. C., on the 3rd, was caused by a locomotive starting from a cinder pit at Raleigh unattended and from some cause undiscovered. It ran about 9 miles north, where it met a southbound passenger train which was moving up grade at low speed. Both engines and one baggage car of the passenger train were wrecked, and the engineman was killed. The fireman and the express messenger were injured.

The collision at Macopin Lake Junction, N. J., on the 4th, was between an eastbound passenger and a westbound freight. The fireman of the freight was killed, and six trainmen were injured. The freight had encroached on the time of the passenger, the men in charge having overlooked the schedule of the passenger.

The collision at Everett, Ga., on the 14th, occurred at 12:09 a. m. It was between an eastbound passenger train and a string of 13 coal cars which had been pushed from a siding to the main track by a freight train which had entered the siding to meet the passenger train. The engineman of the passenger train was fatally injured, and the colored fireman, one colored passenger and ten white passengers were injured. A work train had left 22 empty coal cars on siding, not all of which were coupled together; and the crew of the freight failed to exercise proper precaution in handling their train while pushing cars in the side track ahead of the engine.

The trains in collision at Crayton, Pa., on the 22nd were westbound freights. One conductor and one brakeman were killed, and four trainmen were injured. There was a dense fog at the time.

The train derailed at Blanchard, La., on the 3rd, was a northbound local freight. A car loaded with coal was the first to jump the track, and the cause was the emergency application of the air brakes, due to hose pulling apart. This and two other cars were overturned in the ditch. Three trespassers were killed and two injured.

The train derailed at McIntyre, Ga., on the 3rd, was westbound passenger No. 1, and the cause of the derailment is believed to have been a loose rail. The whole train of five cars was derailed, the engine, express car and the baggage and mail car being turned over on their sides. Three passengers and four trainmen were injured.

The train derailed near Dalton, Ga., on the morning of the 12th, was an excursion train bound for Chattanooga, and the derailment is said to have been unexplainable. Four passenger

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[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

cars were overturned. One passenger and 2 employees were killed and 63 passengers and 3 employees were injured.

The train derailed near Tribes Hill, N. Y., on the 16th, was westbound passenger train No. 3, the fast mail. A car in an eastbound freight was derailed by a broken flange a few seconds before it met the passenger train, and this and other cars fell in front of the passenger engine. This engine was overturned, and the seven cars next behind it ran off the track. Twelve freight cars were wrecked. The fireman of the passenger train was fatally scalded.

THE INTERSTATE COMMERCE COMMISSION'S DECISION IN THE EXPRESS COMPANY CASES*.

In re express rates, practices, accounts and revenues. Memphis Freight Bureau et al. v. Adams Express Co. et al. Opinion by Commisisoner Lane:

It may be said in general that the commission has given consideration in this investigation to the financial affairs of the express companies; the character of their organization; the relation which they enjoy with the railways to the extent and nature of the property which they own; the character of their service; the basis of their rate systems; the cost of their operations; the manner in which the rates are stated; the relation of the service which they give to that extended by the railways in the carriage of freight by freight trains; the relationship between the rates established in different sections of the country for the same service by express; the similarities and dissimilarities obtaining as between express service in the United States and similar service in foreign countries, together with a comparison of the rates in foreign countries with those extended in this country, and other questions analogous or related to these.

Last year, 1911, the 13 express companies made parties to the investigation carried over 300,000,000 packages. They operate over 218,013 miles of steam railway in this country, and extend their service over 18,385 miles of steamship and stage lines and 6,665 miles of electric lines. They paid to these rail carriers and others $69,730,895, and their own expenses, so far as these can be ascertained, arising out of their functions as express companies were $64,305,590.

For many years the country was parceled out between these great companies into zones not unlike those zones of influence which characterize international politics in Asia at the present time. There was, for instance, an understanding that Wells Fargo & Company should not press into eastern territory, while the eastern companies should abandon the great west to that carrier. While these 13 companies are separate legal entities, it is of interest to regard this fact that by stock ownership and otherwise they are so interlaced that it is with difficulty we can trace any one of the great companies as either wholly independent in its management or the agency of a single railway or system. The Adams and Southern are closely affiliated. The American Express Company is the second largest stockholder in Wells Fargo & Company. The largest stockholder in the United States Express Company is also the largest stockholder in Wells Fargo & Company.

Since the civil war, no express company in the United States has been forced into bankruptcy. The death of an express company has always been the result of a change in policy by a railway arising out of some new financial alliance. We have sought to learn the actual amount of cash invested in these carriers and have been unsuccessful.

A survey of the express situation leads to the conclusion that all railways are under the obligation to make through routes and furnish proper facilities for the transportation of freight. The rule applies to parcels as well as to carloads. Express companies are by name placed under the commission's jurisdiction. We must, therefore, regard these companies as agencies created by the railways and recognized by law for the conduct of a certain kind of freight business, to which these agencies have added a service that is distinctive and peculiarly their own. Wherever artificial barriers have been raised by the existence of separate express companies they should be broken down, and rates made and practices followed should neither rest on the foundation of a railway's preference nor of an express company's opportunity. The complaints against the express companies may be grouped under 11 headings.

*The opinion has been very much condensed, but wherever possible the language of the commission has been preserved.

1. DOUBLE COLLECTION OF CHARGES.

This investigation has made it clear that whatever the policy of the companies may have been in regard to double charges, their manner of doing business made such result almost inevitable. The complaints on this score come from all sections of the country and are not confined to any one carrier. A package received prepaid was stamped prepaid, but if the delivering driver's book did not show the package prepaid, he was required to be guided by the book. The most effective remedy which the commission can suggest is the establishment of a uniform system of billing and the adoption of a uniform rule regarding the delivery of packages. A yellow label should be pasted on the package showing the charges prepaid at the time these charges are prepaid, and a yellow way-bill should be made out for prepaid packages. The form of this way-bill and package label are prescribed. A white label should be pasted on collect packages and a white way-bill made out. The express company is to make out these way-bills in triplicate, one being attached to the package, one being reserved by the office at point of origin, and one being forwarded to point of destination. If a package arriving at destination bears no label, the burden is on the express company to deliver the package; and if, on examination of its records, it finds that through its mistake or otherwise the delivered package has not been prepaid, it must look in the first instance to the consignee for payment.

2. OVERCHARGES AND UNDERCHARGES.

The collection of greater than legal charges and failure to collect full legal charges appear to have resulted chiefly from the system of rates which was obscure and open to misconstruction. A new scheme of rate making must take the place of the present complicated rate structure. A system of through rates must be substituted for the present plan of making rates by way of transfer points. As a preliminary to the adoption of such a system, it should be required that carriers establish and publish rates between all points reached by the lines of the various companies. The performance of this task appears to be made possible only by the adoption of a system of blocks and zones. The agent at the receiving station should in every instance revise the charges on the receipt of the way-bill before making collections on collect shipments, and the agent at the point of origin should revise all prepaid way-bills as to weights and charges, and refund overcharges within 24 hours; and it is recommended that the express companies organize a clearing house association for the purpose of devising a proper system to carry out these requirements.

3. CIRCUITOUS ROUTING OF SHIPMENTS.

It has been the custom of express companies, when packages were for delivery at points not on the lines of the railway over which they operate, to get the longest possible haul via their own lines. In many cases the delay has been accompanied by excessive charges based on the long routing instead of the route over which the shipment should have traveled. The company should be required forthwith to establish and jointly publish through routes between the principal points in the United States, which routes shall follow the main lines of travel the most direct in point of time measured by the schedule of those passenger trains by which normal schedules are observed. The carriers should be required to add to such through rates as rapidly as possible and to change them as often as may be

necessary. They must publish a description of such through rates, which will include an alphabetical index of stations, showing the rate number or numbers by which each may be reached. The consignor shall have the right to direct in writing the joint through route by which the shipment shall move, excepting under an emergency.

4. FREE DELIVERY LIMITS.

The popular conception of express service is that it includes the free delivery of the package at the consignee's address. This conception has been fostered and encouraged by the express companies themselves; therefore, it will be ordered that the carriers publish a joint general directory, alphabetically arranged by cities, of all express offices in the United States, the name of each office to be followed by a statement of whether or not free delivery is maintained. Where free delivery service is maintained, unless the publication shall circumscribe the delivery limits it shall be understood that delivery service comprehends the corporate limits of the place named. Copies of this publication should be furnished to shippers at a cost no higher than the actual cost of printing such extra copies as may be required.

5. UNREASONABLE LIMITATIONS IN RECEIPT.

Complaints have been made against the practice of limiting the value of a shipment to $50 unless extra insurance is paid. In all parcels post low limitations of value have been placed on shipments, and this limitation of value is considered proper by the commission.

6. DELAYS IN THE SETTLEMENT .OF CLAIMS FOR LOSS AND DAMAGE.

The commission's examiners, who made an exhaustive review of the claim bureaus of two of the carriers, reported a condition existing therein which indicated a policy of delay in the investigation and settlement of claims of which the management of the express companies seemed to be unaware. It has been the policy of one of these carriers never to conduct any of the negotiations for settlement of claims by correspondence. It is the commission's view that the rule should be, in event of non-delivery or loss of a shipment, that a notice should immediately be mailed by the agent of the carrier at destination to both consignor and consignee, and a claim in writing should be acknowledged immediately on its receipt, and within six months from the date of filing the claim the company should notify the claimant in writing of the disposition made thereof.

7. EXCESSIVE CHARGES ON SHIPMENTS VALUED IN EXCESS OF $50.

Hereafter the valuation charge shall be 10 cents for each $100, or fraction thereof, in excess of $50, and this irrespective of the rate of carriage.

8. CLASSIFICATION OF EXPRESS MATTER.

Originally there were but two classes of express rates—merchandise and special. The express companies competed with the post office, and one time with each other, giving rebates, etc. Now there is a joint publication of rates which separate all movable property into merchandise and general specials. Numerous instances of obscurity of classification and complexity are given, which show that the large and frequent shipper can get lower rates than the uninformed and infrequent shipper. There are concealed low rates, such as section E rates, section D rates, and still lower section A rates. For the simplification of this classification it is suggested that all articles taking higher than merchandise rates shall be grouped under the rate prescribed.

9. DELAYS IN THE RETURN OF C. O. D. COLLECTIONS TO CONSIGNORS.

Cases of retention of C. O. D. collections for more than a year have been reported to the commission. The character of these complaints warrants the conclusion that the rule should be that the delivering agent shall make return of all C. O. D. collections to the consignor or to the agent at the point of origin within 24 hours after delivering such collections, and that the agent at the point of origin in time must make settlement with the consignor within 24 hours of the receipt of such collections.

10. METHODS OF STATING RATES.

There are 35,000 express stations in the United States, and separate rates to each station would require 600,000,000 rates. We propose to substitute a rate system, based on the division of the country into 950 blocks, being the squares formed by 1 deg. of latitude and 1 deg. of longitude. These blocks are each 69 miles long and have a width varying from 62 miles to 45 miles, and embrace on an average 3,500 square miles. The blocks are to be numbered, beginning at the northwest boundary of the state of Washington, with the number 101. The blocks are numbered consecutively in tiers across the country. The second tier begins with 201, located directly under 101. There are 120 blocks in which there are no railway or express stations, so that the total number between which rates have to be made is 830. To make rates as between points near each other in adjoining blocks equitable, each has been divided into 16 sub-blocks, lettered from A to Q, omitting J. Points within each block are common points, except as to adjacent blocks. Rates shall be stated in scales, giving a rate applicable to packages weighing from 1 to 100 lbs. The scale applicable between two blocks is found by reference to the single sheet tariff posted in each express office. A similar sheet gives the scale applicable to all points in sub-blocks located within a radius of two blocks, or approximately 100 miles.

11. RATES.

An express company is an agency of the railway for doing small parcel business. Clearly we cannot take the mere horses and wagons, desks, etc., as the value of the property used in expediting movement of freight by rail carrier. The real asset of the express company is the contract which it enjoys with the railway company. It must be treated as the railway itself would be treated.

The original express company was a man with a carpet bag, paying his railway fare and traveling between New York and Boston with a few packages of an especially valuable nature. We feel safe in the statement that outside of the money which has been made in the express business, a million dollars would more than cover the original capital of all the express companies. It appears quite evident that the foundation of a reasonable rate cannot be the return on the property of the express companies as such, no matter how offensively large or absurdly small this may appear to be when calculated from the balance sheet.

There is no real substance in the contention that rates may be made with respect to the capitalization of these companies. This capitalization has largely been a matter of arbitrary bookkeeping, and there can properly be no relationship whatsoever between the capitalization and the rates.

We may not fix express rates on the basis of the earnings of the express company, for this is a matter which we cannot control. Earnings depend very largely on the contract with the railway company.

The commission also finds that there cannot be a fixed relationship between express and freight rates. A comparison of earnings by passenger train for passengers and for express matter, while not in any way conclusive in determining the express rate, has been borne in mind in the rates here suggested.

No one thing has been so fruitful a cause of complaint as the so-called scale of graduated charges. This scale is unreasonable, discriminatory and arbitrary. It is the product of years of shrewd manipulation and has no justification in the minds of express men themselves. An examination of the tables of rates leads to the conclusion that they are the product of a cunning effort to impose on the general public by the exaction of exorbitant charges for those small packages which the mail cannot carry and the railway does not wish to carry.

CONCLUSION.

For the correction of evils that the commission has found, there appears to be but one remedy—the construction of a rate system that should cover the United States. This has been

a task of unprecedented magnitude and difficulty. The commission's effort has been to make certain that ample compensation shall be allowed on a reasonable basis for the full service given; to the railway for its passenger train movement and to the express company for all that it does both for the railway and for the shipper. We have not attempted to segregate the amount that should go to each, however, the public being primarily interested in the gross charge which the express carrier makes. There being no uniformity in rates now, it has become necessary to increase some rates under the tariff here presented. These increases, however, affect almost exclusively the rates on packages of higher weights. To give shippers and carriers abundant time to analyze the rates, the order at this time will require carriers to show cause on October 9, 1912, why the proposed rates should not be put into effect.

ELECTRIC RAILWAYS IN EUROPE.*

BY C. E. EVELETH.

There is considerable activity in making plans for rather extensive electrifications for steam railways in several European countries. The conditions are varied, the more prominent perhaps being the greater capacity obtained for tunnels where the traffic is now limited by problems of ventilation; the utilization of cheaper grades of fuel, the attractiveness of utilizing water powers which may be developed at low cost, and the elimination of expensive steam pusher service on mountain grades. The ordinary European drawbars are designed for normal working pulls of 12 to 15 tons, and breaking strengths of approximately twice these values. With American drawbars some recent tests have shown breaking strength from 100 to 150 tons, and the normal working values may be considered about 40 or 50 tons. In other words, the American drawbars will stand at least three times as much as those in use on the continent. Over there they have practically no automatic couplers, the cars being generally coupled together by links with turnbuckles. The train weights in Europe are generally about one-third of those in this country. Not more than 60 tons can be utilized on the drivers in Europe, whereas we do not hesitate here to couple two locomotives together, giving a total weight on the driving axles at the head end of the train of about 200 tons, as in the Detroit River and the Great Northern electrifications. The lower tractive effort at starting demanded for the European machines results in radical differences in the electrical design.

In general the schedule speeds for suburban passenger service are much lower than in this country, particularly Germany.

England.—For the present the electrification problem in England seems to be essentially one of heavy city-suburban traffic. Several of the large cities, notably London, Manchester and Liverpool, are confronted with problems of this character. The operation of the present electrical suburban systems in England has been successful in increasing traffic receipts, and the various elements which go to make up the installation costs, operating costs, etc., are beginning to be better understood. The directing heads of a number of the principal railways seem to be satisfied that electrification is coming and are inclined to face the problem with considerable aggressiveness. With the exception of the electrification of the London, Brighton & South Coast, very little new work has been done in England during the last five or six years, but at the present time considerable activity is evident.

Suburban electrification has been much affected by the introduction of motor buses and the extension of surface tramways. This, together with the advantage from electrification, is well illustrated by the experience of the London, Brighton & South Coast Railway on its loop from London Bridge to Victoria station, where the conditions appear to have been approximately as follows:

About seven or eight years ago on this division, when operated by steam, there were sold in the neighborhood of eight million tickets yearly. On account of the competitive surface transportation development, the sales dropped to about 3½ million tickets a year. Electrification was completed on this division about two years ago, and since that time the ticket sales have increased until now they are at the rate of approximately nine millions a year. This result is brought about by the more frequent and better train service made possible with electrification, and the results have been so convincing that the directors of this road are particularly receptive to electrification possibilities and are already talking of making considerable extensions to their system.

In England electrification has been held back because of the light rolling stock and low operating costs, particularly in the elements involving rolling stock and power, the possible savings being rather less than would ordinarily be encountered in America. There is also difficulty in raising capital for such projects. The directors are extremely reluctant to add anything to their present burden of fixed charges.

France.—The single-phase system is represented in France by one or two small tramway lines and undertakings being carried out by the Midi Railway. This company has purchased five different single-phase locomotives from as many different manufacturers for operation on the experimental lines in the south of France. The conditions on this electrification are peculiar in that sections of the line involve heavy grade haulage and regenerative braking has been specified. Up to March, 1912, three locomotives had been delivered. The electrification of this section of the Midi Railway is being carried out under certain government subsidies, without which electrification would hardly be justified, as there is little traffic on the lines under consideration and but a few trains per day. Several of the lines to be electrified have not yet been built, and it will probably be several years before the locomotives are in active commercial operation.

The 2,400-volt three-wire direct-current system at Mure is now being extended with a trolley having 2,400 volts between the contact conductor and the track. The 60 h. p. motors for the passenger cars of this extension, when operating at 50 per cent. over potential, at 100 per cent. overload in current, look very good on the test stand, and they will undoubtedly be successful in operation.

Without question the most serious undertakings contemplated in France today are those connected with the electrification of the steam roads at Paris. Both the State Railways and the Paris-Orleans contemplate considerable extension of their electric suburban lines. These electrifications will be carried out with direct current and the third rail.

Switzerland.—The Simplon tunnel, is the only heavy traction system in operation in Europe outside of Italy, and is of special interest on account of the long period of time it has been in operation. This division of the State Railways is equipped with a three-phase system. Its operation seems to be in every way successful and satisfactory. Judging from the appearance of the repair shops and the number of men at Brigue where the locomotives are maintained, the roundhouse costs for these machines must be very low. In this tunnel great trouble was experienced from insulation breakdowns on both motors and transformers due to condensation when the cool locomotives passed through the center of the tunnel where there are a number of hot springs and the tunnel temperature is about 115 deg. F. This condensation resulted in every portion of the electric locomotive being drenched with water. It is now avoided by keeping the locomotives warm by allowing them to stand over pits at the terminals in which heaters have been arranged.

The other three-phase installations in Switzerland, while interesting individually, in most instances are carried out under peculiar local conditions.

The single-phase experimental installation on the Sieback-Wettingen line, after operating somewhat over a year, was discontinued on account of high operating costs, due largely to in-

*From a paper read before the American Institute of Electrical Engineers at Schenectady, N. Y., May 17. Reprinted from the *Proceedings* of the Institute.

frequency of service, and on account of the rather serious interference with the national telephone and telegraph systems.

At the Loetschberg tunnel, which will be opened within the next year or two, some experimental work has been carried out and the engineers have decided to adopt single-phase current and have now in operation at Spietz one 100-ton, 15-cycle freight locomotive built by the Oerlikon Company. This machine is at present used to haul one train a day weighing about 300 or 400 tons between Spietz and Fruitigen, a distance of about ten miles (16km.), the maximum grade being 1.5 per cent. The locomotive selected is a two-motor geared side-rod machine with a single helical gear for passenger service.

The electrical engineers of the Swiss government have made comparative studies of the various systems to enable them to select a system for the Gotthard tunnel electrification, which may be carried out within the next two or three years. As a result of their analysis they find that the single-phase system is about 20 per cent. less in first cost than the three-phase system and about 33 per cent. of the cost of the undertaking if carried out with direct current.

Italy.—The most important electrifications in Italy are the three-phase installations carried out by the government at Valtelina, Mount Cenis and the Giovi tunnel near Genoa. The extensions now contemplated involve the purchase of several hundred locomotives within the next few years.

The electric locomotives on the Genoa division will soon, if they do not already, haul about 15,000 freight cars a day. This electrification is a commercial one in every sense and is in fact by far the heaviest section of electric traction on the continent. The results from regenerative braking have been more satisfactory than were anticipated. A most extraordinary and perhaps unexpected saving has been found from the saving in the wear of the track rails. When the Giovi tunnel was operated entirely by steam the up-grade rails lasted about twelve years and the rails on the down-grade tracks about three and one-half years. Apparently the restricted axle movements with brakes on the descending steam train resulted in a scouring action on the rail head. At any time during the steam operation, fresh deposits of metallic dust from the rails and brake shoes were to be seen on the ballast.

Since the inauguration of electric operation under the same traffic conditons about one and one-half years ago, the indications are that the down-grade rails will last as long as those on the up-grade tracks. This saving of practically two sets of rails in twelve years with the tonnage over the Giovi tracks is recognized by the maintenance of way department of the government, and is being allowed as one of the electrification economies in the studies of their divisions where electrification is contemplated and the tonnage conditions correspond to those at Genoa. This saving alone is estimated to be equivalent to approximately the total interest on the power plant and transmission system. So far as I know this character of saving has not been recognized in America, probably due to the fact that practically all of our tunnels with grades are single track and the difference of wear between the ascending and descending tracks has not been recognized with the steam service.

Regeneration has also effected a material saving in coal at the power house with the present electrification. The calculated saving was anticipated to be 16 per cent. By running a period of time utilizing regeneration and a period without, keeping careful track of the tonnage of the load, a saving of 17 per cent. of the coal has been realized at the power house. When the entire division is electrified, and this work is now progressing as rapidly as possible, the calculated saving in coal will be much higher. The difference in the energy represented by the present saving and anticipated saving is now wasted in the water rheostats at the power house, which are adjusted to dissipate energy in excess of that which can be utilized by ascending trains.

The Italian engineers are enthusiastic over the three-phase system for their conditions, and such results as have been obtained certainly warrant their enthusiasm.

Germany.—The most important contemplated developments in Germany are in connection with the state-owned properties. About six years ago the engineers decided upon the standardization of single-phase. Up to the present time all of the government work has been of an experimental character, but this has been combined with commercial operation in the case of the Hamburg-Blankenese-Ohlsdorf line where multiple unit motor car trains are in use. The German engineers, while expressing themselves as satisfied with the performance of their single-phase motor cars, are inclined to believe that the future work of electrification will be carried out with locomotives, the operating costs of the Hamburg equipments having proved rather high.

At Hamburg a very interesting comparison between motor-car operation with single-phase and 800-volt direct-current will soon be available, as the Hamburg-Hochbahn, occupying for a short distance the same right of way as the government single-phase line, is equipped with the 800-volt direct-current, third-rail system. The schedule speeds of the two roads are practically the same, though the direct-current system makes an average stop in about 1,900 ft. (579 m.) as contrasted with an average stop in 4,000 ft. (1.219 m.) for the single-phase.

For the electrification of the Stadtbahn-Ringbahn in Berlin where the limitation of strength of the drawbars makes it impossible to obtain the desired acceleration with one single-phase locomotive, it is the intention to use two such locomotives, one at each end of the train. The extra type of these locomotives has not been determined, except that they will each be equipped with a single motor and side rods. Some unique methods of motor and transformer cooling are being proposed, but the final details have not been settled. The program of the German government contemplates the purchase of several hundred locomotives during the next three or four years; and the electrification from Magdeburg to Halle, about 145 miles (233 km.), in Silicia has already been authorized.

Sweden.—In Sweden water power can be developed at a very low cost and immense storage capacities insure continuity of power supply. For these reasons electrification on some lines will undoubtedly be justified where there is a train only once in three or four hours. The Swedish engineers have done a very considerable amount of experimental work.

The Swedish government has recently contracted for the equipment of one of its lines in Lapland to transport iron ore from Kiruna to Rikgransem.

The Swedish engineers are further engaged in the development of gasolene-electric and Diesel-electric car equipment in which they seem to have considerable faith, and it is their intention to use these equipments very generally throughout the kingdom.

A 28 mile railway is proposed from Mahon to Crudadela on the island of Minorca, Balearic islands. This line will have five tunnels, which will be 650, 690, 345, 313 and 614 yds. long respectively. The rolling stock will consist of 4 locomotives, 4 first-class passenger cars, 3 first and second-class passenger cars, 10 third-class passenger cars, 1 parlor car, 25 box cars, 14 gondola cars and 14 flat cars. It is estimated that the total cost of the railway will be $1,445,050, of which $195,839 will be spent on tunnel construction, $202,712 on track construction, and $150,786 on rolling stock.

The Longitudinal Railway, Peru, has been completed from the Bolivian border to Cuzco, from which point a concession has been given for the construction of a line to Santa Ana. This line has been surveyed from Cuzco through Apancay to Ayacucho, and is under construction between Ayacucho and Huancayo. About 20 miles of this line has been completed. From Huancayo to Oroya over the Central Railway, and from Oroya to Cerro de Pasco and Gollarisquisga over the Cerro de Pasco Railway the lines are in full operation. From Cerro de Pasco to Recuay surveys have been made for the construction of a line to connect with the Chimbote Railway, now under construction, at Huaylas. From Huaylas north to the boundary of Ecuador the route has only been partly surveyed.

RAILWAY TOOL FOREMEN'S ASSOCIATION.

The third annual convention of the American Railway Tool Foremen's convention opened on July 9, 1912, at the Hotel Sherman, Chicago, Ill., with about fifty members present. President E. J. McKernan, supervisor of tools, Atchison, Topeka & Santa Fe, presided and asked Robert Quayle, superintendent of motive power of the Chicago & North Western to deliver the opening address.

Mr. Quayle chose the motto of the association—Higher Efficiency in Railway Tool Service—as his theme and drew attention to the fact that this included the efficiency of men even more than it did the efficiency of tools. The highest efficiency is stimulated by the expressed appreciation of a superior officer. This applies as truly to a foreman as it does to a superintendent and neither will be truly efficient unless he gives words of appreciation and encouragement to those under him when they are deserved. It is far from the truth to state that opportunities for advancement are decreasing; they are actually continually increasing. It is always possible to make your own opportunities. Mr. Quayle urged the association to make itself valuable in connection with standardization, aiming at system standards in all cases. Individual shop standards, when they differ in the various shops of the system, are of but comparatively little benefit, while standards that hold throughout a system are of great value.

MILLING CUTTERS AND REAMERS.

A. R. Davis, tool foreman of the Central of Georgia at Macon, Ga., presented the first paper of the session, on the subject of milling cutters and reamers, their formation and tempering. Mr. Davis said that he believed the tool foremen had been bound too much by tradition and were making milling cutters with many flutes of a given form and spiral simply because they have always been made that way. His experience indicated that considerable improvement could be made by decreasing the number of flutes and increasing the total angle of milling cutters. He drew attention to a paper presented before the American Society of Mechanical Engineers by Mr. De Leeuws on Milling Cutters and Their Efficiency, and gave several quotations from it to illustrate the value of the new forms of cutters. With 3½ in. cutters having nine flutes, and 4½ in. cutters with ten flutes, which correspond to about 1½ in. spacing, and with a 1/32 in. face of tooth, he had been able to remove as high as three cubic feet of machinery steel with one grinding. Not a single cutter of this type had broken in service. Tables were included giving the number of teeth for various diameters of cutters and end mills. These were based on a spacing of 1¼ to 1½ in., which was recommended for the best results.

Helix cutters were given an angle of 12 degs. on one side and a ½ in. throw eccentric relief. The 2½ in. cutter has a 1 in. arbor and eight teeth for end mills and reamers. The 3 in. has a 1¼ in. arbor and ten teeth for milling cutters. For taper reamer, tests indicated that an eight deg. angle of spiral consumed the least power. A table was given showing the relative power consumption in steel for 1⅛ in. to 1 3/16 in. reamers having from five to ten flutes of different styles. The five flute spiral nickel gave the least power consumption, being but 39.23 per cent. of the ten flute staggered. For reamers over 3 in. in diameter the inserted blade type was recommended.

For tempering, the barium chloride furnace was recommended for high speed steel and the lead pot for carbon steel.

Discussion.—There was considerable argument for and against the spiral peg cutter. Some members had given it up on account of the many broken teeth and the difficulty with grinding. Others are using it successfully. No conclusions were reached on this feature. It was evident that most of the speakers were in favor of the inserted blade cutters for the larger sizes. One road uses this style for all cutters over 7 in. in diameter. The best method of holding the blades in place was given some attention, and at least three ways are giving satisfaction, viz.: taper pin with a flat side against the blade and set in a radial hole; wedges in the slot, and blades caulked in the body. Soft steel bodies with high speed steel blades were reported as unsatisfactory by several members. In connection with hardening the blades, it is the general practice to first remove the scale,.

STANDARDIZATION OF STEEL FOR SMALL TOOLS.

Henry Otto, tool foreman of the Santa Fe at Topeka, Kan., as chairman of the committee on this subject, presented a report in which he recommended the dividing of carbon steel into four grades, each to include a range of ten points of carbon. This would cover all steels from 65 to 105 points. He suggested temperatures suitable for forging and hardening each grade. The former ran from 1,750 deg. for the first grade (65 to 75 points) down to 1,600 deg. for the fourth grade. For hardening the temperatures should be 1,480 deg. for first grade and 5 deg. less for the second, etc. For annealing, 1,250 to 1,300 deg. was recommended for all grades. A list of the tools to be made from each grade was included.

A. Sterner, tool foreman, Chicago, Rock Island & Pacific at Chicago, a member of the committee, recommended dividing all tools into but three classes—tool room tools, boiler shop tools and blacksmith shop tools. The first to include all taps, reamers, milling cutters and other cutting tools. For this work "special grade" steel is used. The tools in the other classes are those subject to vibration and heavy pressure strains. For these "extra grade" steel is used except for beading tools and forging dies. In ordering steel, the purpose for which it is to be used should be specified. Painting the bars with a colored strip for the full length and using different colors to designate different grades was recommended.

Discussion.—A comparative low carbon steel—75 to 80 points—was generally favored for punches. In some cases even lower than this had given good service. One member reported good results with 35 point vanadium steel for chisels in air hammers. Mr. Martin (C. C. C. & St. L., Beech Grove, Ind.) suggested crowning the die as a cure for broken punches. Tire steel was reported as being the most economical material for rivet snaps. It does not last as long as vanadium steel, but its lower cost more than makes up for this. High speed steel was reported by several members as giving excellent service with punches over one inch in diameter.

TREATING OF STEEL IN ELECTRIC FURNACES.

The paper by B. Henrikson, tool foreman, Chicago & North Western at Chicago, briefly explained the method of tempering special steels in a forge or furnace requiring a blast. This consists of packing the steel in powdered carbon and sealing in a metal box. Two types of electric furnaces, one using a liquid bath and the other an open chamber, so arranged that the amount of air admitted could be accurately controlled. Barium chloride or other salts are used in the first type, a composition being selected which will become liquid at the desired temperature. While the author stated that he had had but little experience with an electric furnace, he had found its simplicity and accuracy to be very advantageous.

Discussion.—There was practically no discussion on this subject. Mr. Schaffer, general inspector of tools of the Illinois Central at Chicago, read a report of a committee of steel men on some tests made with an electric furnace in Detroit.

STANDARDIZATION OF SMALL TOOLS.

The discussion on this subject was long and active, and covered the practice of practically all of the railways represented in making various tools. Beading tools with 13/16 in. shanks, octagon, and forged in dies either under a hammer or in a forging machine were recommended by several of the speakers. The steel should not be hard enough to break in service. Roller expanders, staybolt drills and boiler stud taps were each discussed at length. An attempt to have the association formally recommend a taper tap with 12 threads per inch for

boiler studs was defeated. The subject will be brought up again next year.

CHECKING SYSTEMS FOR TOOLS.

The committee on this subject made a report which recommended giving a man, when first employed, six numbered checks. The number on the checks should correspond with his shop number. No tools should be issued except in exchange for a check and all tools should be returned to the tool room each night. No workman should receive his time until he has a clearance from the tool room foreman. An experienced man should issue all tools from the tool room.

Discussion.—A method to prevent the loss or loaning of checks was accorded considerable discussion, which finally resulted in the passing of a motion to the effect that the association favored the issuing of six checks to each workman and any that were lost or unaccounted for when the man quit should be charged against him at the rate of twenty-five cents each.

Election of Officers.—The following officers were elected for next year: President, J. Martin (C. C. C. & St. L., Beech Grove, Ind.); first vice-president, A. N. Roberts (B. &. L. E., Greenville, Pa.); second vice-president, H. Otto (Santa Fe, Topeka, Kan.); third vice-president, M. B. Roderick (Erie, Hornell, N. Y.); secretary-treasurer, A. B. Davis (Central of Georgia, Macon, Ga.); executive committee, O. H. Dallman (Pennsylvania, Chicago, Ill.); C. A. Sheffer (I. C., Chicago, Ill.); A. Sterner (C. R. I. & P., Chicago, Ill.); J. J. Sheehan (N. & W., Roanoke, Va.), and E. R. Purchase (B. & A., Springfield, Mass.).

The report of the secretary-treasurer showed the total membership to be 68 and a balance in the treasury of $60.22.

Chicago was chosen as the place for holding the next annual convention, and the secretary was authorized to enter negotiations with the General Foremen's Association seeking to bring the convention of the two bodies in consecutive weeks for the greater convenience of the supply men, most of whom desire to exhibit their products at both conventions.

FREIGHT CLAIM ASSOCIATION.

The twenty-first annual meeting of the Freight Claim Association was held in Buffalo, June 19, with President W. L. Stanley (S. A. L.) in the chair. President Stanley in his opening address praised the work of the committees. The conference committee, which was appointed to deal with the Interstate Commerce Commission, has held no meeting during the past year. Mr. Stanley urged members to co-operate generously with the government, never assuming that the representatives of the commission intend or desire to hamper the claim agent in his work. The president appealed to members to loyally support the arbitration committees. These committees constitute a court of last resort, and agents should take care and not object to its decisions on anything but the weightiest consideration. Losses of freight continue so heavy that this association will soon have the duty of prescribing rules for marking, packing and handling freight. Mr. Stanley exhorted the members of the association to lead in the fight against commercial waste.

W. Heyward Drayton, assistant to the general agent of the American Railway Association, addressed the meeting briefly on the work of inspection bureaus. Henceforth the inspecting agents will take notice of marking and packing of freight, as well as of the contents of packages. Mr. Drayton has found that a large percentage of claims are based on damage to merchandise by water because of leaky car roofs. An instructive report on freight cars was published in the *Daily Railway Age Gazette* of June 14, last. Mr. Drayton advised every claim agent to get a copy of that paper. The inspection of freight cars made before loading freight into them could be greatly improved almost everywhere. Mr. Drayton referred to the action of the Master Car Builders' Association regarding the matter of keeping freight cars up to the highest state of efficiency; resolutions were passed by the M. C. B. urging the American Railway Association to promote liberal appropriations for keeping cars always in first class condition. Mr. Drayton thinks that repairs to freight cars are often delayed, because when a car is away from home it does not receive the thorough attention that it would in the hands of its friends.

The meeting discussed a rule presented by the executive committee regulating the adjustment among members of claims for perishable freight, which was adopted. Approval was also given to the proposition that under no circumstances should freight be held at junction points for prepayment; charges should be collected under the rules of the Accounting Officers' Association.

The meeting adopted and referred to the American Railway Association and the Accounting Officers' Association a proposed interline waybill for stray freight, the bill to be recorded but no money items to be entered. It is proposed to use such a bill regardless of ordinary interline waybilling arrangements.

During the past year 75 cases which have been decided by the appeal committee have been edited, indexed and published; and another similar pamphlet will soon be finished. The officers of the association elected for the ensuing year are: President, F. E. Shallenberger (Union Line); first vice-president, Geo. W. Perry (Great Northern); second vice-president, J. W. Newell (C. B. & Q.); secretary and treasurer, W. P. Taylor (Richmond, Fredericksburg & Potomac), Richmond, Va.

The chairmen of the three arbitration committees are George C. Arnold (L. V.), R. K. Slaughter (Chesapeake Steamship Company), and J. M. Eedson (Michigan Central). The chairman of the appeal committee is J. J. Hooper (Southern Railway). The conference committee is continued for the ensuing year.

The next meeting of the association is to be held at Bluff Point, N. Y., June 18, 1913.

On the Swedish State railways they are making very careful and thorough experiments with peat as fuel for the locomotives. Among other tests, some have been made on the section between Elmhult and Alfvsta, on several different types of engines. These tests have yielded no satisfactory results, as the locomotives cannot use this fuel without alterations. With reference to the tests already made, there have been many suggestions as to changes to be effected in the construction of the engines, and in a few months it is expected that a satisfactory peat-burner type of locomotive will be designed.

The French will extend their line in Syria, which now runs from Tripolis to Homs, to Bagdad, Asia Minor. While the other Bagdad line, which is backed by German and French capital, and which has already been commenced, will run from Tigris river to Bagdad; the Tripolis-Homs line will run through the desert via Tudmar and the old ruined city Palmyra, Busera, Mejadin, Aba Kemal and Hit—that is, down stream along the Euphrates river, then to Bagdad. Alexandretta would thereby become the port of the German and Tripolis, that of the French, Bagdad line. The new railway would be of great strategical value, and would do no harm to the German line, as the importance of this latter lies in the direct connection of Constantinople and Asia Minor, with Mesopotamia and Bagdad. The French line does not touch these districts, and therefore will not hurt the German plans. The new line would only make a shorter connection between the coast and Bagdad than the German one, which will run in a long curve through Mesopotamia. The French line would be 721 miles long. It would be of military importance only, so far as it would permit quick connection with the troops of the eighth army corps in Damascus; while the German railway, if built in accordance with the original plan, will connect with all the troops in Asia Minor and with European Turkey.

Maintenance of Way Section.

THE advisability of using a certain method or device to accomplish a certain piece of work can only be judged by knowing fully the conditions surrounding the handling of this work. While the approved methods which have been thoroughly tested should be used under normal conditions, it sometimes happens that the circumstances surrounding work are such as to render such methods impracticable and to make advisable the adoption of methods which would not otherwise be desirable. An instance of this is a method of driving piles without any leads, which is described by Mr. Lawton elsewhere in this issue. Many bridge engineers will strongly oppose such practice, and in general the opposition will be justified. But the conditions in this case rendered desirable the adoption of a method which in other circumstances would have been inadvisable. The man in charge must carefully consider local conditions before deciding the means of handling a problem. It is safe to say that methods made standard as a result of experience are the best in most cases, but no one method can be applied to all problems, and cases develop in the handling of large work where the man in charge must use his ingenuity and is sometimes forced to sacrifice certain features to gain other desired ends.

SEVENTEEN contributions were received in the Bridge Kink Contest which closed June 25. The judges, W. C. Armstrong, bridge engineer of the Chicago & North Western; I. L. Simmons, bridge engineer of the Chicago, Rock Island & Pacific, and C. Chandler, engineer bridges and buildings of the Chicago Great Western, awarded the first prize to A. Swartz, division engineer, Erie, Huntington, Ind., for his description of a Z-hook for shimming bridges, and second prize to P. H. Hamilton of the St. Louis & San Francisco at Pittsburg, Kan., for a description of a "homemade" grab for handling material. Other contributions were received from R. P. Black, engineer maintenance of way, Kanawha & Michigan, Charleston, W. Va.; H. S. Cowell, draftsman, Seaboard Air Line, Portsmouth, Va.; C. L. Ketcham, general foreman steel bridges, St. Louis & San Francisco, Pleasanton, Kan.; A. S. Markley, master carpenter, Chicago & Eastern Illinois, Danville, Ill.; J. L. Taylor, assistant division engineer, Grand Rapids & Indiana, Ft. Wayne, Ind.; L. C. Lawton, division engineer, Atchison, Topeka & Santa Fe, Newton, Kan.; G. R. Barry, division engineer, Pennsylvania Lines, Zanesville, Ohio; S. C. Tanner, master carpenter, Baltimore & Ohio, Baltimore, Md.; W. K. Walker, division engineer, Missouri Pacific, Wichita, Kan.; F. M. Patterson, assistant engineer, Chicago, Burlington & Quincy, Chicago, and H. D. Gettys, general bridge inspector, Norfolk & Western, Roanoke, Va. A number of these papers are printed in this issue and others will be published in later issues.

COMPLAINT is heard on all sides of the scarcity of labor, not only for railway work, but for the steel mills and other manufacturing industries as well, and railway construction work is being delayed in some instances because of this condition. While this is more or less of an unusual experience at this season of the year, it is accentuated at this time for several reasons. Comparatively speaking, the past three years have been dull and there has been an excess of unskilled labor. As a result the emigration of foreign laborers has exceeded the immigration so that the supply of this kind of labor has been materially reduced. Also, the general slackening of construction work in this country, combined with the very great activity in Canada, has drawn many men, especially hobos, into that country. The Italian-Turkish war and the Mexican revolution have also had the effect of holding many men at home who would otherwise have come to this country, and, as was remarked recently, have killed many possible track laborers. The railway industry is subject to great variations in demand for labor, and as employment on track work is of but six or seven months' duration at best, it is natural that the railways suffer first when a shortage of labor occurs, as is the case this year. When the millennium in railway operation comes, a certain amount of work will be done each year, and this amount will be distributed as evenly as possible throughout the entire season; and then the ever recurring labor shortage with every wave of prosperity will largely disappear.

THE importance of good tools to the successful prosecution of any class of maintenance work is so generally recognized that the higher maintenance officers on many roads now spend much time in investigating the relative merits of different kinds of tools for the various classes of work, and standard tool books are prepared and revised from time to time showing those tools which are considered most suitable. No one is better able to judge of the value of good tools or design, or to improve a tool for a particular use, than the man who has to use it. A large proportion of the practical tools in use today are the result of the observation and study of men close to the work and many roadmasters and frequently foremen are often consulted when selecting such tools. Many times these men devise tools for definite purposes which are made in the local shops and their use is confined locally to one division, although they may be equally useful on many other roads. The improvement may consist in the making of an entirely new tool or of a small change in some detail. The change of the design of a spike maul, a tamping bar or pick, or of a bridge tool, may be of great advantage to the user. Several such tools have been described in these columns and adopted by railways with excellent results. The experience of one roadmaster was recently mentioned who noted in an article published in the issue of the *Railway Age Gazette* of October 20, 1911, describing rock ballasting methods on the Michigan Central, that a spade was used on this work in place of the ordinary shovel. By adopting this on his own road he has made a saving this spring of several hundred dollars. It is our desire to multiply these instances as much as possible, and we announce a contest on the subject of Tools, to include descriptions of any tools which can be employed to advantage in any branch of maintenance work, including track, bridge, water supply, etc., and which are not now generally used. We will pay $25 for the first and $15 for the second best description of tools received, while all other descriptions accepted and published will be paid for at our regular space rates. Special attention will be given by the judges to the practicability of the tools and the scope of the field for their use in making the awards. All contributions must be in the hands of the Civil Engineer Editor of the *Railway Age Gazette*, 417 South Dearborn street, Chicago, Ill., not later than August 25.

PROBABLY no class of track laborer now available to any extent is capable of doing such good work under the direction of an experienced foreman, but is at the same time the cause of so much grief to the inexperienced foreman, as the negro. It requires years of contact with negroes for a foreman who has not grown up among them in the south to learn their characteristics. One roadmaster who worked negroes for four years remarked recently that he was just beginning to understand them. The popular conception of the negro is as far in error as it is concerning the "hobo." The average person not acquainted with them considers the tramp and the "hobo" as of the same class. Likewise, the opinion is prevalent that the real southern negro is indolent and incapable of work. It.

is true that this applies to a certain class, but in the black belts of the south the track laborers, almost exclusively negro, will compare very favorably with those found on the track in other portions of the country. No class of laborer is so dependent upon intelligent and experienced supervision as the negro, but with a capable foreman good results are almost universally secured. One point referred to but briefly in the papers published elsewhere in this issue is the negro's love of riding. He is naturally fond of traveling, and spends a large portion of his earnings for trips. On the Nashville, Chattanooga & St. Louis last summer it was noticed that most of the extra gang laborers working on the lines south of Nashville lived north of that city, while those working north of Nashville lived south of it. It was found that the reason why the men prefer working away from home is that thereby they get a ride home on Saturday nights and back to work on Monday mornings. Likewise a number of roads have found that the motor car is a good means for attracting negro labor for section work, because of the negro's fondness for riding back and forth. The question of wages paid is also interesting. Being naturally improvident, to the negro a dollar in hand today seems much larger than two dollars in prospect tomorrow. On the Yazoo & Mississippi Valley it was found that negro labor could be secured more readily at $1.10 per day where the men were paid each Saturday night than at a considerably higher rate when payday came but once a month. In addition, the men were more regular in their work, for they would have an opportunity to spend their weekly wage over Sunday and would be back on Monday morning without losing any time, whereas when paid only at the end of the month they would be gone several days, it taking longer to spend the larger accumulation of money.

THE timber-treating plant of the Philadelphia & Reading and Central of New Jersey, described on another page in this issue, is of interest as an example of the important development now going on in the wood preserving industry on eastern roads. While the entire output of treated timber from the wood preserving plants is not devoted to railway uses, the proportion of it used by the roads is so large that the development of this industry in the railway field is indicated fairly accurately by the study of the location of new treating plants. Until within the last few years the number of wood preserving plants in the eastern states has been limited and the greatest development has been in the central and southwestern states, until on some western roads, having a large proportion of branch line mileage, over 25 per cent. of all ties now in track are treated. In contrast with this, a number of the eastern roads had very few or no treated ties in track until within the past three or four years, and this holds true on some roads, both in the east and the west, even up to the present time. A list of plants given in the last annual proceedings of the Wood Preservers' Association shows that about two-thirds of all the plants in the country were built during the decade ending with the year 1909, and that about half of that number were built within the last three years of this period. Of 55 plants built during that 10-year period of most rapid growth, only nine were located in the eastern states, while the number in the central states was increased by 23, and in the western states by 14. During the years 1910-1911 the tendency for eastern roads to adopt treated timber more generally was shown by the fact that of 15 plants put in service during those years, six were located on the eastern seaboard. Six plants are now being built in the eastern states to treat timber for railway use. Several of these plants are capable of furnishing a sufficient number of ties to provide for the full annual requirements of the roads for which they are built, and treated ties will be used very largely, if not exclusively, for main lines. On the Delaware, Lackawanna & Western, for instance, creosoted ties are now used exclusively on main lines. An interesting point noted in these new plants is the great preponderance of creosoting plants as compared with those using zinc chloride and other processes. This doubtless is largely due to the belief that the rapidly increasing price of timber justifies the adoption of more expensive processes and is also influenced somewhat by the proximity of these treating plants to the seaboard, for a large proportion of the creosote is imported from Europe. It will be interesting to watch the effect of this increased demand for creosote on the supply, for it has been the experience for several years that the output of creosote has not been equal to the demand, since it is a by-product and the price obtained does not justify its production where there is no sale for the other coal car products produced in the coke districts. With the rapid increase in the number of these treating plants it is to be expected that the use of treated timber will increase very rapidly and that it will be found advisable to treat timber for other purposes than those for which it is now treated. The experiment which one western road is now making of treating timber for stock or car floors is interesting, and if successful may be extended to car roofs and other details of equipment construction.

THE SAFETY MOVEMENT IN THE MAINTENANCE OF WAY DEPARTMENT.

INAUGURATED less than two years ago on the Chicago & North Western, the "safety first" movement has spread until now safety committees are organized on at least 18 railways, and this number is rapidly increasing. In fact, six roads have announced their intention of establishing safety bureaus within the past thirty days. The purpose of this movement is to remedy dangerous conditions surrounding the men and to promote the spirit of watchfulness for their own and their fellow employees' welfare.

While the number of accidents is greatest among the transportation and shop employees, and for this reason the greatest attention has been directed towards increasing safety among them, there is also much opportunity for improvement in the maintenance of way department. Here, as in the other departments, a large proportion of the accidents is avoidable, resulting from the carelessness of employees. The reports of the Interstate Commerce Commission for the year ending June 30, 1911, show that 2,871 railway employees were killed and 45,848 injured during the fiscal year; and of the killed 570, and of the injured 1,394, were track and bridge men.

As a result of recent legislation less difficulty is encountered now with improper blocking, or lack of blocking, of frogs and guard rails which were formerly the source of many accidents, although one still finds dangerous conditions existing. However, there still remain a large number of details, all of which are the causes of serious accidents to workmen. A frequent cause is the piling of material too close to main or side tracks, resulting in brushing men off the sides of cars, especially along tracks where clearances are not as carefully observed as along main lines. Where buildings or other permanent structures are within the clearance limits it is the duty of the maintenance department on many roads to properly set and maintain boards warning employees of the lack of these standard clearances. Frequently ballast, ties, rail, etc., are put so close to the track that a man stepping from a moving train runs the risk of being thrown back under it. The piling of stone, reinforcing bars and timber about the end of a bridge undergoing reconstruction is a not uncommon example.

With the rapidly increasing proportion of foreigners in track work the responsibility of the section foremen to his men increases greatly. Being unfamiliar with the work as well as with the language, many of them are continually being hurt by allowing rails or other heavy materials to fall on them. For these reasons the percentage of foreigners hurt is much greater than of native laborers. Several roads have published their books of rules for track and bridge employees in several languages in order to warn these men of dangerous prac-

tices. As mentioned elsewhere in this issue, the negro is particularly free from accidents of this class, for, as negroes work in unison with some chant, the men in a gang act as a unit in handling heavy material and a man is seldom injured by the others letting go of material.

A large proportion of the maintenance men killed are struck by trains. Many accidents result from men on hand cars or motor cars taking chances in going around sharp curves where the track ahead is not visible without taking proper precautions to see if a train is approaching. The number of men struck by trains while at work also increases rapidly with the addition of multiple main tracks, this ratio of increase being far greater than the increase in the number of tracks. Becoming confused by an approaching train on one track, a man will frequently step in front of another approaching on another track. On three and four-track lines the danger is especially great, as a train passing on one track will drown the noise of another approaching train. To eliminate this danger, at least one supervisor on the Pennsylvania Railroad has issued positive orders to his foremen to see that all men step clear of all four tracks when a train is passing on any one, believing that he can afford to lose this additional time rather than to run the increased risk of accidents.

Many accidents result from comparatively unimportant infractions of the rules, which it is the duty of the foreman to enforce. A frequent cause is the collision of handcars or motor cars. If not properly controlled the men will often race on these cars, and an accident to the front car or the dropping of a tool on the track will cause accidents to the following cars. Most of the rule books used by the roads specify distances of at least 200 ft. between hand cars, and greater distances between motor cars. The taking of unnecessary chances by men working about bridge erecting derricks, steam shovels, and other apparatus without being certain that it is in good condition frequently results in injury.

Men in charge of the various branches of maintenance work as well as other work may well take great pains to cultivate the "safety first" habit among their men. The pointing out of bad practices among their subordinates should have a good influence, and if this is not effective, discipline should be applied. One supervisor sends out bulletins to his foremen following accidents to forces similarly employed in the vicinity, giving the details and the causes, and being careful to show in what way they were avoidable. A roadmaster on the Chicago & North Western at Chicago has organized a safety committee among his foremen to aid him in detecting and correcting careless practices. He finds that this plan works very satisfactorily and that as a result of monthly inspections made by the committee about the terminal many conditions more or less dangerous have been remedied and the number of men injured has greatly decreased.

NEW BOOKS.

The Coal Trade. By Frederick E. Saward, Editor *Coal Trade Journal*, 20 Vesey street, New York. Price $2.

The 1912 Coal Trade is the thirty-ninth annual handbook covering statistics and conditions in the coal trade. It is a handbook that is essential to those interested in the coal business, and is of value to railway men whose roads carry any considerable amount of coal. A good history of the trade, not only for the whole country, but for the important individual sections of the country in which coal is produced or marketed, is given, and the handbook also includes a great number of short studies on various subjects connected with coal which are very useful as references. The book might be compared to a newspaper almanac, devoted, however, entirely to one subject. The value of such a handbook is affected very much by the kind of index which accompanies it. The index of *The Coal Trade* seems to have been prepared conscientiously and fairly fully.

Letters to the Editor.

RELIEVING THE TRACKWALKER.

KINGSTON, N. Y., June 15, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

On account of the greatly increased passenger traffic during vacation time, extra attention should be given to main tracks. The greatest amount of individual responsibility falls upon the trackwalker. The present system of trackwalking can be greatly improved upon in a manner which would be of benefit to the trackwalker, the condition of track, and the traveling public. Five hours is all that a trackwalker should be required to patrol track daily. Taking into consideration that he is compelled to be alone for the greater part of the time, and considering the effect of this solitary work on his mind after years of this daily routine, also the strain involved during the extreme hot and cold weather, we can realize to a small extent what trackwalking means. The effect of being alone and continuing at the same tasks day in and day out is to make the mind dull and weak; it cultivates a more or less fault-finding disposition, and finally is apt to cause carelessness, due to insufficient association with other men. The trackwalker's mind should be alert and active, quick to perceive danger, and capable of remedying such danger with as little delay as possible.

Therefore this man should be relieved from trackwalking after half a day of this work by another man whom the foreman would appoint to walk track for the other half of the day. Only the most reliable and experienced men should be assigned to act in this capacity. The morning trackwalker could then spend half a day with the section gang, and vice versa. This association with the other men would be of great benefit to the trackwalker, both mentally and physically, and would develop in him the required dexterity necessary for the proper performance of his duities.

JOS. J. MORGAN,
New York Central & Hudson River.

In connection with the bulletin issued by the management of the Pere Marquette with the object of inducing employees to effect little savings, a table was prepared which showed the value of supplies commonly used by employees in terms of transportation. The following items may be of interest to maintenance of way department employees:

	Miles.
Two-cent postage stamp (equivalent to hauling one ton of freight)	3½
Lead pencil (equivalent to hauling one ton of freight)	2
Track spike (equivalent to hauling one ton of freight)	2
Track bolt (equivalent to hauling one ton of freight)	3½
One pound of waste (equivalent to hauling one ton of freight)	10½
One white lantern globe (equivalent to hauling one ton of freight)	20
One red lantern globe (equivalent to hauling one ton of freight)	75
One lamp chimney (equivalent to hauling one ton of freight)	10½
Fusee (equivalent to hauling one ton of freight)	13
Lantern complete (equivalent to hauling one ton of freight)	100
Track shovel (equivalent to hauling one ton of freight)	90
One hundred pounds coal (equivalent to hauling one ton of freight)	20
One gallon switch lamp oil (equivalent to hauling one ton of freight)	25

Steam shovel No. 257 working in the west borrow pit of Gatun dam, Canal Zone, excavated a total of 84,519 cu. yds. place measurement in the 26 working days of May, or an average of 3,250 cu. yds. a day. This is the highest monthly record for a shovel of any class since the beginning of work on the isthmus

COLLECTION OF PRACTICAL BRIDGE KINKS.

Successful Methods Not Generally Used in Connection with the Maintenance of Temporary and Permanent Structures.

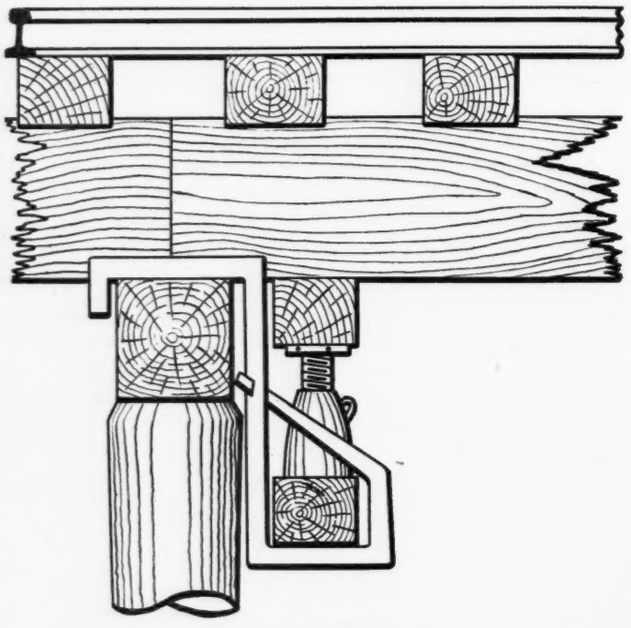
FIRST PRIZE—Z-BAR FOR SHIMMING BRIDGES.

BY A. SWARTZ,

Division Engineer, Erie, Huntington, Ind.

During the life of a pile bridge it is often necessary to shim up the deck on account of poor surface conditions caused either by the piles settling or by stringers or caps crushing. It is then necessary to raise the deck by placing the wooden shims between the stringers and caps. This necessitates lifting the stringers under one rail, or perhaps under both rails.

A very simple and effective support for the jacks necessary is made by shaping a square iron rod about 1½ or 2 in. square into the shape of a "Z" or double hook, as shown in the sketch. Two such hooks are necessary. To use them one end is placed over the cap and a stick of timber of any desirable size is inserted in the loop at free end of the hook. This provides a foundation on which to support the jack or jacks. Between the jack and stringers it is necessary to place a stick of timber long enough and strong enough to raise the floor



A Z-Bar for Shimming Bridges.

system. In this manner a great deal of time and unnecessary carrying and placing of blocking for the jacks is saved. In the case of shimming necessary at bents over the water, a rigging such as described is very easy to operate from a raft.

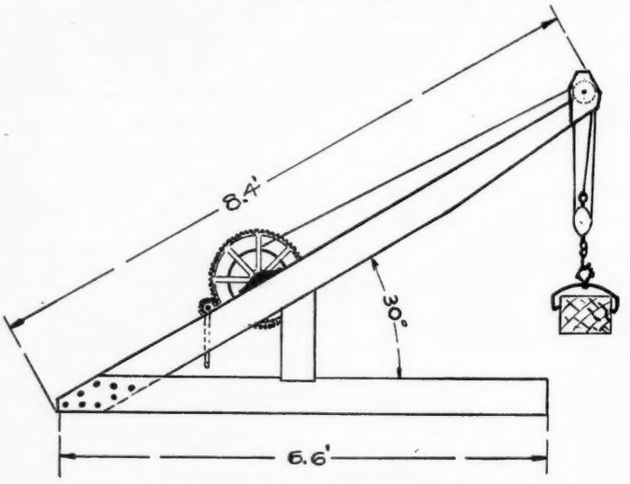
The end of the hook which goes over the cap should be wide enough to slip over the cap and allow for any bracing or inequality in thickness of piles. Seventeen or eighteen inches is about right. The height of the "Z" should be great enough to allow for the jack with six-inch timbers below and above the jack.

SECOND PRIZE—A HOMEMADE CRAB FOR HANDLING MATERIAL.

BY P. H. HAMILTON,

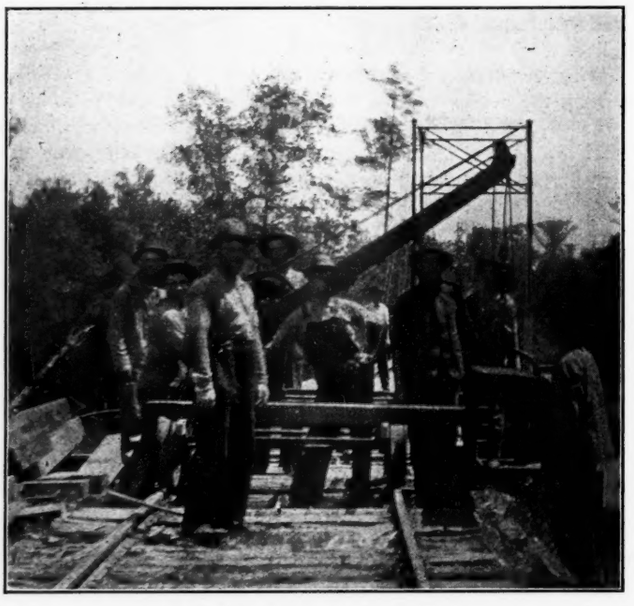
St. Louis, San Francisco, Pittsburg, Kan.

A crab and winch for handling heavy material has been devised and is being used very successfully on one division of the 'Frisco. It was used during the past season by a bridge gang and was found to be very convenient for carrying stringers, caps and other heavy timbers out on to bridges and lowering them in place. It is planned to build a similar car for use in handling frogs, rails and other heavy material in the track department. The car consists of a beam mounted on a push-car frame and inclined vertically at an angle of 30 deg. with the



Arrangement of Hoisting Frame.

horizontal. A snatch block is suspended from the upper end by a rope passing over a block at the end of the beam and down to a hoisting drum. This drum is geared to a small wheel to which a crank is attached. The hoisting drum is made from the bull wheel and pinion wheel of a hand car, and a 12-in. x 12-in. x 30-in. piece of pine which is rounded off to



Crab Handling Bridge Timbers.

form a cylinder. A hole is bored through the center for the brake staff, which forms the axle. The end of the pine cylinder is mortised out so that the spokes of the bull wheel will be set into the wood and the bull wheel is keyed to the axle to keep it from slipping. The pinion wheel is placed below the bull wheel on the frame so that the cogs will fully engage the

cogs on the bull wheel. Another brake staff is used for the shaft of the pinion wheel, cranks being fastened to each end of the staff. To prevent the car from tipping when handling heavy timber a rail-clamp is provided which fastens over the ball of the rail on the side opposite the load.

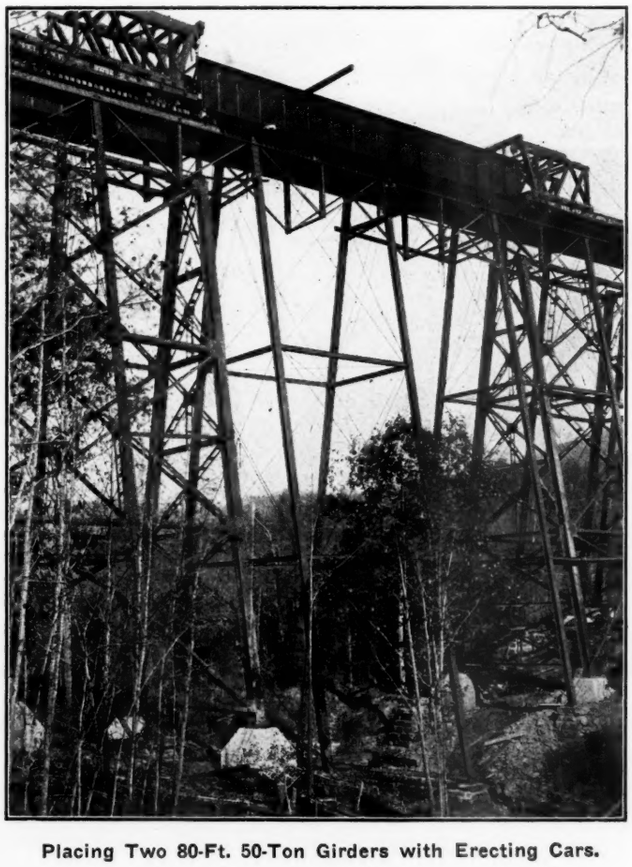
The complete bill of material for building this car was as follows: Two 3-in. x 10-in. x 12-ft. crossing planks for leads; two 3-in. x 4-in. x 8-ft. pieces; three 3-in. x 4-in. x 2-ft. pieces and three 3-in. x 4-in. x 1-ft. 6-in. pieces for the frame; one bull wheel from hand car; one pinion wheel from hand car; one set of boxings for pinion wheel and bull wheel from hand car; one 12-in. x 12-in. x 30-in. piece to be rounded to make cylinder for winding rope; two brake staffs; two cranks for attaching to pinion wheel; one set of double blocks; one single block; one set of timber tongs; one clevice; 120 ft. of ¾-in. rope. The material is all of a kind that is ordinarily on hand. The crab was built at a cost of between $5 and $10.

ECONOMICAL ARRANGEMENT FOR HANDLING HEAVY GIRDERS.

BY C. L. KETCHAM,

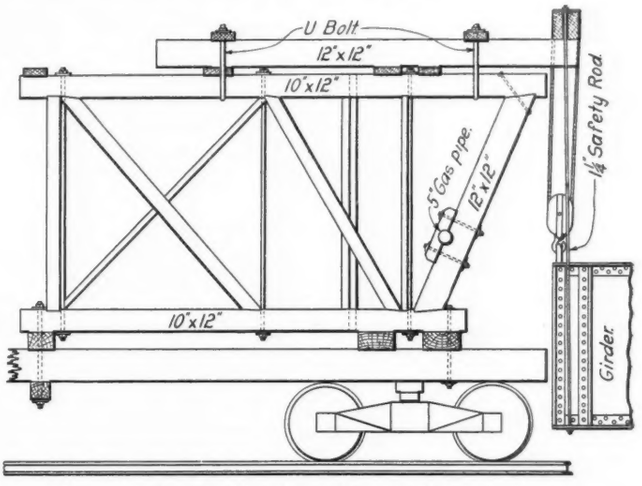
General Foreman of Steel Bridges, St. Louis & San Francisco, Pleasanton, Kan.

The accompanying photograph shows a method for handling girders economically which has been used extensively on the St. Louis & San Francisco. Several years ago the 'Frisco had about 6,000 tons of bridge material, consisting principally of plate girders, to erect. After studying carefully the methods in use on the different roads and finding none satisfactory, the scheme of carrying the girders suspended between two cars was decided on, and frames were built as shown in the drawing herewith. The upper timber is movable, so that it can be shoved back over the body of the car when not in use, being held in place by U-bolts. On account of lack of head-room, no pulley block is used at the forward end of the upper member, but the timber is rounded off and the rope works over this directly. When moving the girders out on the bridge, the safety-rod is used, as shown in the drawing. The 5-in. gas pipe provided on the forward inclined member is used to snub around when lowering the girders into position. No power is required for handling the girders, as they are unloaded on cribbing for storage and when transferred to the bridge are not lowered until directly over their final position.



Placing Two 80-Ft. 50-Ton Girders with Erecting Cars.

With this method girders of almost any weight and length have been handled at less than one-half the cost and delay to traffic which would have resulted with the old methods. As



Car for Handling Heavy Girders.

an instance, the girder shown in the photograph was 80 ft. long and weighed 100,000 lbs., while the structure was 130 ft. high. The new girder was spotted in place, the ties and bracing of the old structure removed, the new girder lowered between the chords to position and the ties and rails replaced in two hours and twenty minutes. This was done without weakening the old structure in advance or without requiring the use of any false work. This was not a special case in any way, as this time was frequently reduced and heavier girders were handled. The structure consisted of towers and girders. These tower girders, 40 ft. long, were replaced, including replacing of track, in forty minutes.

OUTER RAIL GUARD FOR BRIDGES.

BY R. P. BLACK,

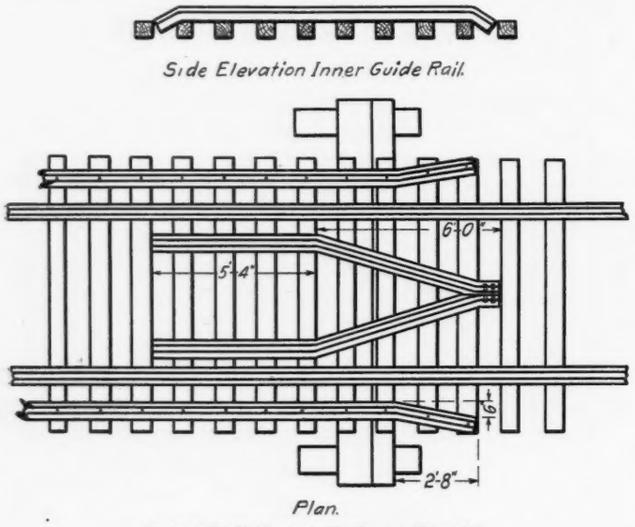
Engineer, Maintenance of Way, Kanawha & Michigan, Charleston, W. Va.

The outer guard rail on a floor system, either over a wooden trestle, a steel girder or truss bridge of the common type is a 6-in. x 12-in. timber dapped to engage each tie and is often very ineffectual in accomplishing the desired result. Besides serving as a tie spacer, the guard rail is intended to prevent derailed trucks of a moving train from going off the deck of the bridge. This wooden guard of the common design is only 5½ in. high above the ties, and after the timber is aged a few years, does not offer much resistance to the wheel of a badly slewed truck from biting into the timber and climbing over it.

On the accompanying plan is shown a rail guard rail which tends to more effectually prevent the wheels getting off the floor deck. A relay or good scrap rail of the same weight and section of the main track rail is laid on its side on top of the tie, outside of the track, with the inner edge of its base 9 in. from the gauge of the main track rail. The rail is drilled for ½ in. lag screws over the center of each tie and is attached to the tie with a lag screw 8 in. long. By this means the ties are securely held in place, thereby gaining a considerable advantage over the wooden guard rail. The daps in the wooden

guard rail for engaging the tie often become worn wider or the intervening timber breaks out, allowing the track tie to slew. The base of the 90-lb. rail is 5½ in. wide, which gives sufficient height to prevent the wheel from climbing, although the base is laid on a slight angle from the vertical. This rail guard rail will, on account of its stiffness, add considerable in keeping the deck and track in good alinement. The cost of material and labor of installing it is about the same as that of the wooden guard rail. Its life is indefinite and an additional advantage is gained in that it eliminates carrying in stock the extra timber for wooden guard rails. At the end of the bridge the guard rail is bent out to assist in engaging a derailed wheel of a truck approaching the bridge.

Inside the main track rail two inner guide rails are placed,



Outer Rail Guard Rails on Trestle.

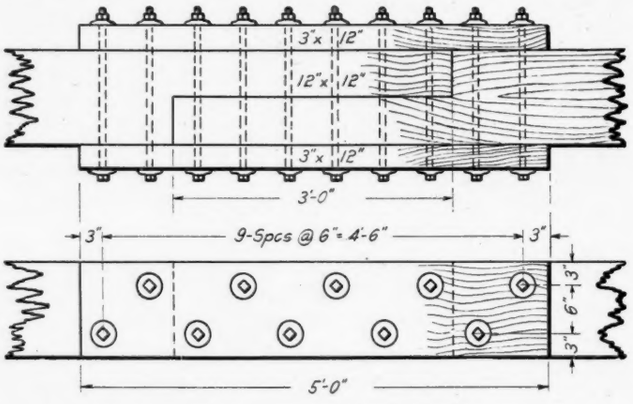
as shown on the plan. The two pieces of rail used for this purpose can be of a lighter section than the main track rail, and can be made of scrap rail. They are bent downward at each end, so that the tops at the end will be level with the ties, to prevent loose parts dragging on trains from catching the end of the rails. At the approaching end of the guide rails, the bases are planed off so the balls of the two rails fit close together and are bolted to each other.

These guide rails from the approaching end are bent to the angle of a No. 4 frog, until they become within 8 in. of the gage of the track rail, where they are then bent parallel with the main track rails for a distance of 4 ft. to the other end. The rails are termed guide rails, as their purpose is to guide or pull the wheels of derailed trucks of approaching trains inside the outer guard rails. The wheels being pulled inside the guard rails, it is not necessary to lay these inside guard rails for the remaining length of the bridge, as the outer guard rails will keep the derailed wheels on the deck of the bridge.

A TIMBER SPLICE.

BY H. E. GETTYS,
General Bridge Inspector, Norfolk & Western, Roanoke, Va.

In case of a washout or the destruction of a trestle by fire, with the consequent interruption to the movement of trains, the essence of the whole situation is time, and anything which will shorten the work in the erection of a temporary structure is of great advantage. The splice shown in the accompanying sketch has been used for a number of years in cases where trestles are too high for one length of timber and where it would be necessary either to erect a trestle in several sections or benches, or to adopt some such device. The use of this splice also enables considerable economy to be effected in the amount of timber required as compared with a benched trestle. As an instance of the advantage of such a splice, several years ago a freight train broke into three sections, which came together on a steel viaduct 85 ft. high, 220 ft. of the structure collapsing and carrying with it twenty-seven loaded cars. These cars and their contents, as well as four spans of latticed girders, had to be removed before any temporary work could be installed. In building a new bridge the trestle posts were spliced out in the manner shown, to make the full height of 85



Splice for Framing Long Timber.

ft. from cap to sill. All holes were bored for the bracing on the ground, except one end of each brace, which it was necessary to bore from a boatswain's chair. The entire work of reconstruction required but two days and nineteen hours from the time of the arrival of the bridge gangs until the new structure was ready for traffic. At another point there was erected by this method a trestle 65 ft. high, which has been in service 11 years under engines weighing 100 tons and which is still in fair condition.

PILE DRIVING WITHOUT LEADS.

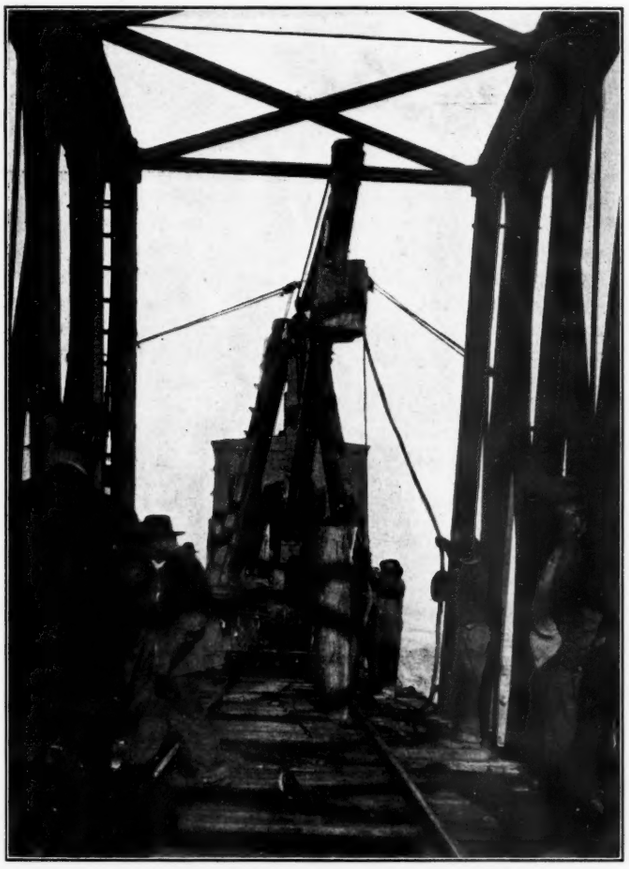
BY L. C. LAWTON,
Division Engineer, Atchison, Topeka & Santa Fe, Newton, Kan.

The following method of pile driving is not new, but it is not in general use, or even generally known. As far as I know, it was first used by C. E. Elmore, of the Santa Fe, in Southern Kansas, where a large number of old Howe trusses were being removed. It was not possible to drive false work under these with a track driver, on account of the interference with overhead laterals which could not be safely removed. To overcome this difficulty a heavy timber was laid on the top chords of the bridge at right angles to the track, and directly over the location of the proposed pile bent. This being fastened in place, the location of each pile was marked on it. A short, medium-weight hammer was then swung from a large pulley, which in turn was hung so that the center line of the hammer would be under the location of the pile as marked on the timber. It was usually necessary to carry the rope through one or more snatch blocks to reach the drum of the engine at the correct angle. As there were no leads or guides whatever to the hammer, unusual care had to be taken in setting the pile and keeping it in place with guy ropes. It takes a skillful man at the drum to drop the hammer at the proper instant without letting it get into a swing, but it can be done, and as many as 25 50-ft. piles have been driven per day.

This method is also being used to advantage in driving foundation piling in bridge excavation work where the shoring will not permit the use of a groundhog driver. In doing this frame bents are set up on either side and the supporting timber moved along them.

The photographs and the following details refer to a concrete case where any other means would have cost more money and with less safety. During this past winter it became necessary to replace two 103 ft. wooden trusses over the Smoky Hill

Hammer Descending on a Pile.



Driving a Pile Without Leads.

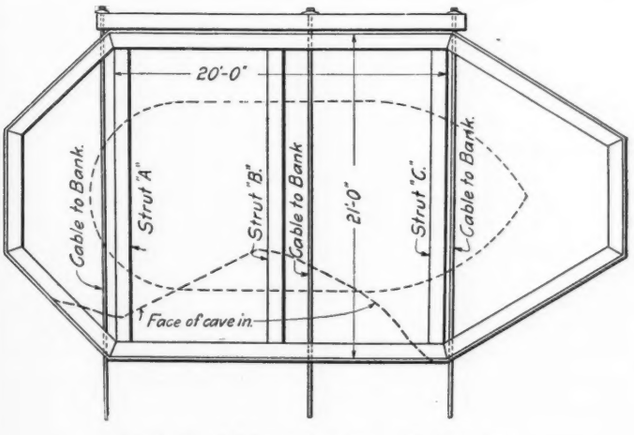
river with through girders on remodeled masonry. Because of the danger of freshets occurring at any time of the year, and also because of the large amount of drift at such times and especially of ice gorges it did not seem advisable to trust to false work for any length of time. As a result it was necessary to keep the trusses intact until the top of piers had been remodeled and the erecting gang had the girders ready to set in place. The portal of the truss prevented any use of pile driver leads in driving, so a thick hammer was attached to a cable, which was run through the block at the end of the boom of a car derrick and snubbed to the drum of the engine. The derrick was first used to get the piles in place, during which time the hammer rested on the deck of the bridge. The piles were drawn up from below, as the bridge was 25 ft. above the water. This took more time than the driving of the pile. The hammer was released just as it swung in line after reaching its full height, the success of the work depending upon the quickness of eye and hand of the men doing this. The boom was of sufficient length to give a full drop from the top of the truss to the hammer, which was held steady by two guide lines in the hands of good men. No piles were broken and only one split at the head, while all had a good penetration in sand and boulders. The men were all new to this manner of driving, but the cost was no more than it would have been with a common driver working under same conditions. A week's time was gained in this way over the old method of building out skeleton buttresses on the outside of the truss and then removing the portal and cross bracing to permit driving with leads. As it happened, this week meant several months in the erecting of the bridge for the concrete in the piers was finished just before steady zero weather set in. When the concrete was in shape to receive the girders the trusses were disconnected on the false work and taken out by a large derrick car and the girders set in place.

STRAIGHTENING A COFFERDAM.

BY FRANK M. PATTERSON,

Assistant Engineer, Chicago, Burlington & Quincy, Chicago.

In building a bridge some years ago one of the piers was located on the sloping bank of the stream, and steel interlocking sheet piling 32 ft. long was used to allow the excavation to be carried to rock. On the east side the top of the sheet piling, when driven, was about at the ground level and on the west side the natural surface was about 10 ft. lower. It was



Method of Strengthening a Cofferdam.

intended to use the method of bracing shown in the plan, but to permit the excavation to be made with an orange-peel bucket strut "B" was not put in place. The bracing was spaced at intervals of about 8 ft. vertically.

The stream, while ordinarily containing little water, was subject to very rapid rises at times of heavy rains, a rise of 10

or 12 ft. often occurring within a few hours after the rain began. On the day excavation was completed a heavy rain set in and work was immediately commenced to remove the large centrifugal pump from the pit and to put the omitted struts in position. Before this work could be completed the water reached a stage preventing further work and the cofferdam was submerged until the second day. After the water subsided it was found that a slip had occurred, breaking strut "A" and the wale on the east or bank side of the cofferdam, and that the side of the cofferdam had been pushed inward until it occupied a position about as shown by the broken line on the plan, the deflection from its true position being between seven and eight ft. The location of the neat lines of the pier at top of cofferdam is shown in dotted lines.

It was noted that the deflection of the sheet piling was greatest at the top and the inclination measured by a plumb line to the water level indicated that the bottom of the sheet piles had not been disturbed, so it was decided to jack the sides of the cofferdam back sufficiently to allow the forms to be put in.

To accomplish this a 12-in. x 12-in. wale was made fast to the outside of the west wall of the cofferdam and stayed by means of heavy wire cables to some large trees on the bank. The earth to the east of the cofferdam was removed by means of the orange peel and four rachet jacks of 60 tons capacity were placed between the two faces of the cofferdam. The rate of progress was very slow, but in a week's time the side had been jacked over far enough to provide necessary clearance and the work of constructing the pier was begun

To show some of the advantages of steel sheet piling it is interesting to note that after the cofferdam had been straightened up sufficiently to allow the work to proceed the leakage was not excessive and it was possible to pull all of the sheet piling and straighten it for further use.

USING A HEAVY BATTER ON FRAMED BENT TRESTLES FOR CONSTRUCTION PURPOSES.

BY J. L. TAYLOR,

Assistant Division Engineer, Grand Rapids & Indiana, Ft. Wayne, Ind.

Three four-post framed bent trestles crossing deep gulleys north of Columbus, Ohio, were to be filled in. These trestles were adjacent to another railway which crossed these gulleys on fills, with the waterways provided by stone culverts. Under the proposed fills the plain concrete and semi-circular culverts were to be constructed, as continuations of the adjoining stone openings. In order to build the first culvert it was necessary to incline one of the framed bents slightly, throwing this bent inside of the two bench walls of the culvert. The arch was then completed except for an oblong hole through which the four posts of the bents passed. Later these posts were cut off and battered the other way, resting on a sill prepared on the top of the concrete bench, the hole then being filled in with concrete. This method, however, resulted in delays, as the concrete had to be allowed to set well before the load could be placed on it; also the bridge carpenters were required to be on the work at two different times, and it was necessary to maintain slow orders for trains for some time. Therefore, before filling in the other trestle, the framed bents were battered enough in the beginning to entirely clear the concrete work and carpenter forces were not required to return to make changes in the trestles. One bent in each case was battered 3 in. to 1 ft., the other bent being only slightly battered. Wedge-shaped bearing pieces were placed on top of the caps to provide a good bearing for the stringers and the sills were well blocked. The trestles were heavily braced at every panel and a couple of 12-in. x 12-in. timbers were placed from the bottom of the slightly inclined bent to the top of the heavily battered bent as a further precautionary measure. The masonry inspector kept a careful watch on these battered bents, which, however, required no attention except occasional tightening of the wedge above the caps.

NOTES ON THE FINISH OF CONCRETE SURFACES.

BY A. R. BARRY,

Division Engineer, Pennsylvania Lines, Zanesville, O.

The appearance of the finished surface of bridge or other concrete masonry, is dependent upon the care taken in building the forms, and the care used in placing the concrete. With proper attention to these details, smooth uniform surfaces can be obtained with almost any material commonly used for the aggregate, and with any proportion of mixture; but no amount of surface treatment such as rubbing or plastering will produce the desired results, if a smooth and uniform surface is not obtained when the concrete is placed. There is too often a tendency on the part of contractor's foremen, inspectors and engineers in charge, to give too little consideration to the importance of the finish of the forms, and to the spading or working back from the surface of the coarser parts of the aggregate when the concrete is deposited, with the idea of patching up or plastering over any defects which may be found upon removal of the forms. Work so treated will always show up for what it is; a patched-up job.

Concrete should be mixed wet, of such consistency that when the coarser material is worked back from the face the finer part of the mixture will settle in against the forms by gravity and fill all voids without any tamping. It is practically impossible to avoid honeycomb on the surface if the concrete is mixed dry and tamping is depended upon to fill the voids. The use of a wet mixture as indicated, if properly spaded, will insure a sound surface, and will cost less to place than the dry mixture. A special mortar mixture for the face is sometimes used when concrete is mixed rather dry, but this is costly to deposit, and is open to the further objection that, being of a richer mixture than the body of the concrete, it does not respond uniformly with the latter to temperature changes, resulting in checking. A convenient tool for the spading is made by straightening out an ordinary garden hoe, making the blade in line with the handle. To surfaces not enclosed by forms should be floated down with a board or wooden trowel, to get the coarse aggregate below the surface, and no rich mortar should be used for the finish.

The forms are the most costly single item in heavy concrete work, and the contractor will naturally try to keep the cost down, often by the use of too light material. Careful and insistent inspection should be given to insure that forms are strong enough to withstand, without yielding, the forces to which they are to be subjected. Strong and well-braced studding is most essential, especially with thin face boards, and must be set close enough together to prevent the face boards from bending between them from the pressure of the wet concrete. Many pieces of concrete work, otherwise good, are disfigured from this cause. Tongue-and-groove lumber is commonly used, and specified, for face forms. While in small jobs where 1-in. material is used, this matched lumber will fit fairly well and give good results, it is practically impossible to get such lumber in the 2-in. size, which will match perfectly. Unless great care is taken to plane down the inequalities in the surface after the forms are built, such forms will leave lips on the concrete surface which cannot be rubbed off.

The most satisfactory form lumber is 2-in. pine surfaced on one side and both edges, and either 6 or 8 in. in width. Boards wider than 8 in. have a tendency to cup or warp. The use of imperfectly fitting matched lumber, and the cupping of wide boards are responsible for the board marks, which show on many concrete surfaces in spite of the most thorough rubbing. Oiling the face boards will to some extent prevent the cupping.

Twisted wire is commonly used for staying the forms, but stays of ½-in. steel rods are much more rigid and strong, and less liable to distortion. Such rods should be run through waling timbers set back of the studding, and should be jointed with pump rod couplings set about 2 in. inside the finished face forms, which will permit the part of the rod projecting beyond the concrete face to be unscrewed and pulled out when the forms are to be

removed without damage to the concrete surface, leaving only a small hole the size of the rod, which can be filled with mortar so as to be invisible.

Considerable shrinkage occurs in concrete during the setting process, especially if mixed wet. In the case of spandrel walls or wing walls of unequal height, if poured at one operation, this shrinkage will give an uneven top line. It is therefore desirable to place the top concrete after the lower part has set. When a coping is used on such a wall it should be put on at least twelve hours after the lower part of the wall.

While it is desirable to have monolithic concrete construction this is seldom practicable on large work, and there will be joints, both horizontal and vertical, where fresh concrete is placed against that which has set, with a bond more or less imperfect. Such joints may be termed "construction joints." Expansion joints will also be required in most large work. By taking care to secure uniform spacing, and by the use of moulding strips nailed on the forms to define their intersection with the surface, such joints can be made to add to, rather than detract from the surface appearance. Joints should always be in horizontal or vertical planes, except joints in arch rings, and should intersect the surface in straight lines. False joints can be added, by use of moulding strips on the surface, if necessary to secure symmetry.

Joints in walls and abutments offer a passage way for water through the wall, unless the bond is more perfect than is usually the case. Water can be effectually dammed by setting in the concrete at right angles to the joint a strip of tin or galvanized iron about 8 in. wide running the length of the joint near the middle of the wall, half the width of the strip being set in the old, and half in the new concrete.

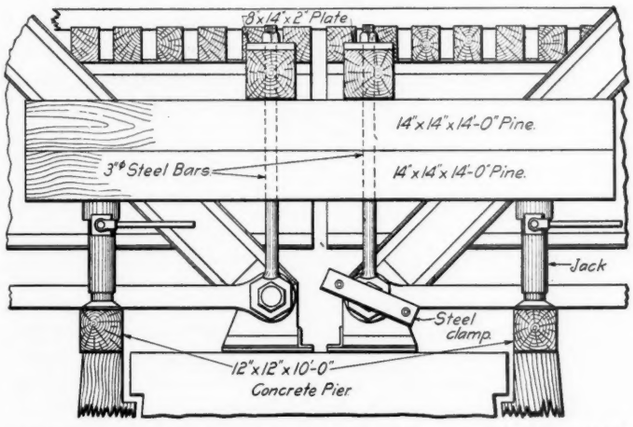
Uniform color in the concrete surface requires uniform color in the cement and in the sand. There is sufficient variation in the colors of many of the standard brands of Portland cement to cause a marked difference in the color of a cement surface if more than one brand is used. Difference in the colors of the sand used have an even greater effect on the color of the finished surface.

METHODS FOR RAISING THE ENDS OF PIN-CONNECTED BRIDGES.

BY A. S. MARKLEY,

Master Carpenter, Chicago & Eastern Illinois, Danville, Ill.

The accompanying sketch illustrates a method which has been used on the Chicago & Eastern Illinois for a number of years, where it has been necessary to raise the ends of pin-connected



Arrangement of Jacks for Raising Ends of Pin-Connected Trusses.

bridges for any purpose. Double-track bridges 155 ft. long and weighing from 375,000 to 400,000 lbs., as well as single track spans 200 ft. in length, have been raised with this method by means of 50-ton ball bearing jacks. The sketch illustrates the method pursued in placing reinforced concrete bearing blocks under 150-ft. spans across the Wabash river bridge at Clinton, Ind. Four 50-ton jacks were used with 14 in. x 14 in. timbers for struts. Iron bars were looped over the end pins and were provided with threads and nuts on the other end. These bars passed through the timbers, resting on the 14-in. x 14-in. yellow pine struts, and were provided with heavy iron plates between the nuts and the timber to provide sufficient bearing surface. By raising the jacks the load was transmitted through the struts and iron bars to the end pins. In case of emergency the trusses can be raised by tightening the nuts on the bolts instead of using the jacks. In order to prevent the loops from slipping off the end pins under the load, iron bars were clamped outside of the loops to the batter posts. This method has been used in raising a large number of bridges without any accident or rupture of either the timber or the iron.

EXPERIMENTS ON CONCRETE WATER BARRELS AS APPLIED TO FIRE PROTECTION OF RAILWAY BRIDGES.*

BY HUNTER M'DONALD,

Chief Engineer, Nashville, Chattanooga & St. Louis.

The maintenance of water barrels for fire protection on bridges and trestles may seem to the uninitiated to be a comparatively small matter. To the person upon whom the responsibility for their maintenance and efficiency rests the matter presents an entirely different aspect. To be efficient, water barrels must be kept full of water and be easily accessible, which essentials entail the following requirements:

The water must not freeze; the barrels must not leak; the water must not evaporate or be drunk by cattle; frequent inspections must be made; the barrels must be filled when installed and frequently refilled; the barrels must be placed at proper intervals for effective use in case of fire; they should be provided with small cans or vessels, in which the water can be carried to the point where it is needed.

The principal damage other than fire risk, caused by freezing, is that it makes the barrels leak. This can be prevented to some extent by fastening in the barrel a stick running in a slanting direction from near the top to the bottom. The addition of salt will, of course, lower the freezing point, but will not prevent freezing. The only consolation to be derived from frozen water barrels is the fact that fires in bridges are not likely to occur in freezing weather.

Where water barrels are completely buried in the earth at the ends of the trestles, they seldom leak until the wooden staves become rotten, which occurs in about four years. If wooden barrels are not buried they require frequent refilling. If carefully covered to prevent evaporation, the interval of filling is lengthened. Should the water in the barrel get low from any cause, the barrel is usually permanently injured by having the tops of the staves dry out—a condition very difficult to remedy. A prolific cause of leaky barrels is the tendency of the idle man or boy with a gun to use them for targets. Axes and hammers are sometimes used as a means of destruction.

Barrels must be substantially covered to prevent evaporation. When tight barrels are buried at the end of the trestle and well covered, refilling is seldom needed more than once a year. Covering is also necessary on account of the tendency of cattle in the dry seasons to drink the water up. It seems impossible to cover them so tightly as to prevent large crops of mosquitoes from being raised. Barrel covers which sink below the outer rim of the barrel are very advantageous, as they catch all the rainfall and allow it to run into the barrel. Where no leaks occur, this is sufficient in many climates to keep the barrels full.

*From a paper presented before the Engineering Association of the South, January 22, 1912.

Unless inspections of the barrels are made at frequent intervals by a responsible officer, they are likely to go to pieces early and be absent or empty at the time most needed. It is not sufficient for the inspector to merely call attention to the defects, but each one should be followed up immediately and remedied.

When barrels are first installed, they should be filled by the party installing them; after this, they should be given over to the section foreman, whose duty it should be to keep them properly filled.

Water barrels can be effective only in the incipiency of a fire. More effective means must be had when the fire has assumed some headway. How to get the water out of the barrel and put it on the fire is a question. On some divisions oyster and tomato cans are sunk to the bottom of the barrel or fastened to the underside of the top by a wire. Sometimes an old paint bucket is used and sometimes a box made of heavy plank. The object is to use something that nobody wants to take away. It is almost impossible to maintain such vessels in the barrels, and the best way is to assume that the person who discovers the fire will use his hat, shoe or something else until organized help arrives. In studying the water barrel question the concrete barrel has come in for its share of discussion, and two experimental barrels were made two years ago. They have the self-feeding top—that is the top is depressed so as to catch the rain water. Neither has required refilling. Both have proved themselves to be proof against bullets fired from a 38-caliber revolver. Below is a table of the estimated cost of making these barrels:

Covers:		
Galvanized iron, 5 square feet at 3 cents	$0.15	
Hinge, bolts, rivets and wire, 5 cents	.05	
Cost of making, one man one hour	.20	$0.40
Barrel:		
17 square feet expanded metal (0.6 pound, 4 feet) at 3 cents	$0.51	
10 cubic yards 1-2-4 concrete at $2.40	.24	
Cost of forms (assuming twenty-five barrels to one set)	.10	
Cost of labor for making barrels at 15 cents	.30	1.15
		$1.55
Add 10 per cent. for engineering and incidentals		.15
Total cost		$1.70

Another experiment has been tried, consisting of a concrete box let into the ground all but about one foot, this upper part being used for the number of the trestle.

It is believed that good concrete water barrels, with metal tops, can be made for $1.30 each when made in large quantities. The wooden barrel is the most expensive of the two, considering its capitalized cost on a basis of six years' life, which is reasonable, leaving out all consideration of increased cost of maintenance.

Other experiments have been made, using galvanized iron forms, and poultry netting reinforcement. Plastering the mortar on has not resulted in tight barrels, but 1:2:4 concrete cast and rammed into forms has given good results. Experiment is also being made with joints of 24-in. clay pipe with concrete bottom, with the bell set upward and buried in the ground.

The ballasted deck trestle is rapidly becoming the standard on most roads, however, and it is thought that in the future the water barrel will seldom be needed.

A bridge of the Northwestern Railway, India, over the Malir river, about 12 miles from Karachi has been condemned as unsafe, and the government has been asked to sanction an expenditure of $455,000 for a new double-track bridge at that point. The Malir river in the dry season contains no water at all, but at times the water is nearly one mile wide, and in some places 30 ft. deep. This bridge has been badly damaged by floods repeatedly, and on two occasions was practically rebuilt.

CREOSOTE IN PILES AFTER 30 YEARS.

The results of analyses of the quantity and quality of creosote found in two treated piles after long service are given in circular 199 of the Forest Products Laboratory Series. The piles were of pine (probably longleaf), and had been in the teredo-infested waters of the Gulf of Mexico for about 30 years. One was perfectly sound, but the other had been attacked, particularly at the water line. The analyses were made to determine whether the difference in their durability could be accounted for by a difference in the amount or character of creosote in the wood. The piles had been treated by the old Bethell process.

Pile No. 1 is said to have been in service 30 years. It was perfectly preserved, showing no indications of decay nor of attack by teredo. The portion above water was badly checked. It

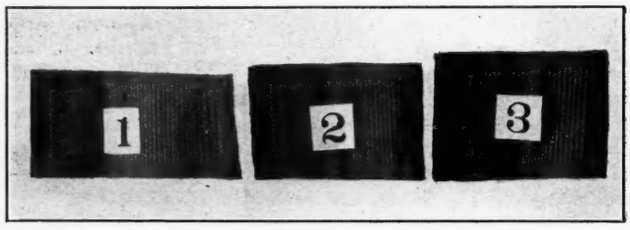


Fig. 1—Radial views of three sections from pile No. 1.

was received in three sections: section 1, taken from above the water line; section 2, taken from near the mud line, and section 3, taken from the lower end of the pile in the mud.

Pile No. 2, which had been creosoted and placed in the Biloxi bay trestle in 1879, and removed in July, 1910, had been attacked by teredo, especially near the water line. Only a portion of the whole pole, approximately 6 ft. long, extending 3 ft. above and 3 ft. below the water line, was received. This will be considered as three sections: section 1, above the water line; section 2, at the water line, and section 3, below the water line.

The radial views of the three sections of pile No. 1 bring out clearly the depth of penetration of the creosote, while the three cross sections of pile No. 2 show that the work of the teredo is in the treated wood.

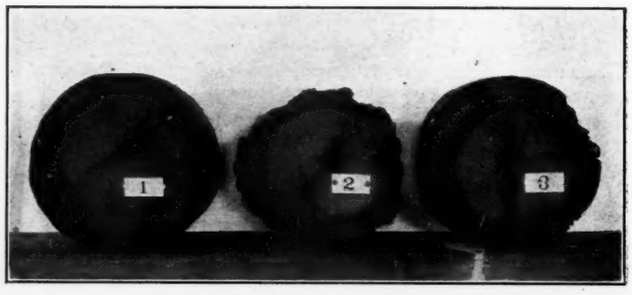


Fig. 2—Cross sections of pile No. 2.

A careful examination of the pile and analysis of the extracted oils showed that practically no light oils (oils distilling below 205 deg. C.) were present in the piles after their long period of service. If originally present, they were lost by volatilization and leaching. The creosote in the pile which was perfectly preserved contained originally at least 40 per cent. of naphthalene fractions, a large portion of which remained in the wood. The creosote in the pile, which was less perfectly preserved, contained little or no naphthalene.

The pitchy matter, which on distillation formed the residue above 320 deg. C. in pile No. 2, is seemingly of an inert character and little objectionable to the teredo. A heavy creosoting with this material did not entirely save the pile from attack

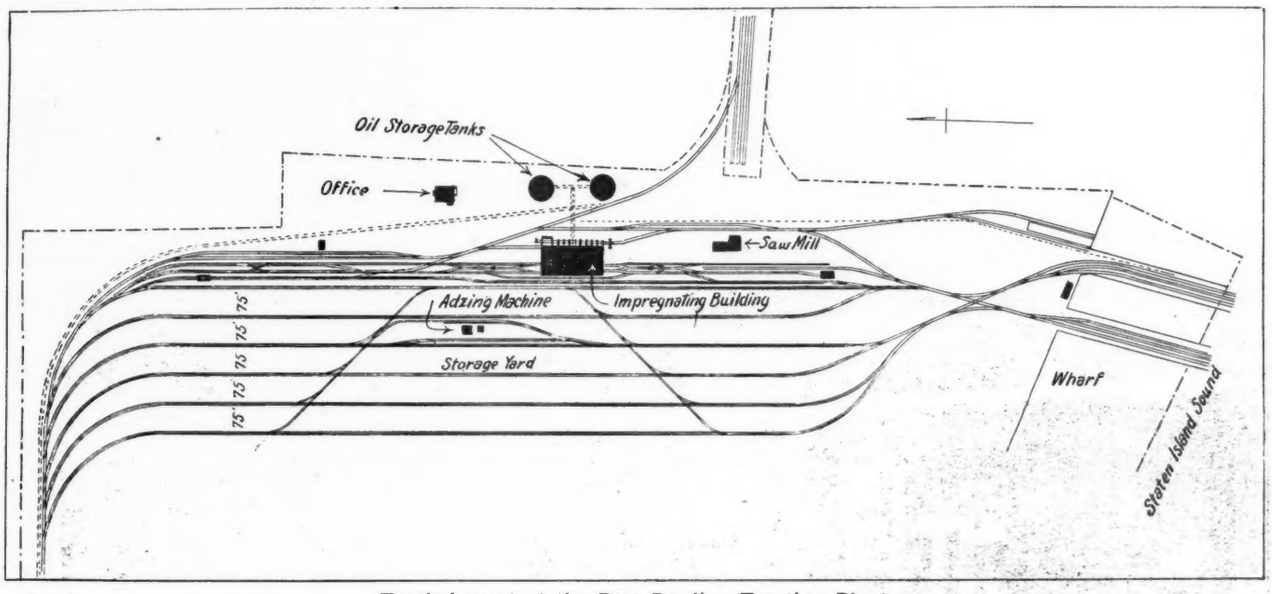
Loss of oil from that portion of the pile in the water in pile No. 1, while is a pure coal-tar creosote, apparently occurred only in the fraction distilling below 225 deg. C.

PORT READING, N. J., CREOSOTING PLANT.

The Complete and Modern Timber Treating Facilities of the Philadelphia & Reading and the Central of New Jersey.

A creosoting plant which is the joint property of the Philadelphia & Reading and the Central Railroad of New Jersey, has recently been completed and is now in operation at Port Reading, N. J. It is very completely equipped and embodies the latest developments in the preservation of railway ties and timber. The location of the plant at Port Reading is an excellent one in that both railways have direct connections to the plant and the deep waterfront affords facilities for the receipt of ties and lumber direct from the south, without any reshipment and railway haul after reaching Port Reading. It also permits the receipt of creosote oil in tank steamers from abroad and thereby does away with the delivery of oil in tank car lots. An eight-inch pipe line connects the piers with the oil storage tanks.

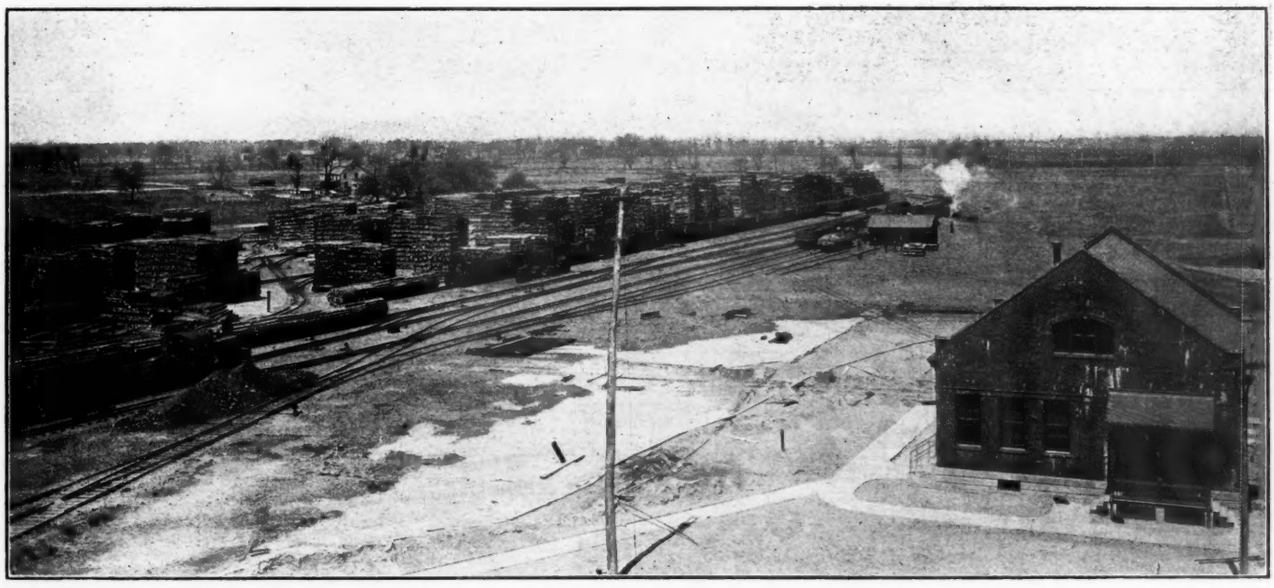
The plant is divided into three sections, the tie and lumber storage yard, the power plant and impregnation building, together with the storage tanks and saw and adzing mills, and lastly, the piers. The area of the ground allotted to the plant is 67 acres; aluthough, only about 47 acres are in actual use at the present time. The general plan of the plant is shown in the accompanying drawing. The yard is crossed by two narrow gage ladder tracks with turnouts leading to each track, allowing quick handling of tram cars to and from the tie yard.



Track Layout at the Port Reading Treating Plant.

YARD ARRANGEMENT.

The track arrangement in front of the cylinders is designed for the quick change of charges. The ordinary change is made in about 12 minutes. The usual arrangement is to charge the ties from the north end of the cylinders and piling and lumber from the south end. Narrow gage scales are located on the



North Yard and Office Building.

center track at both ends of the cylinders, to check up the volumetric readings. There is also a combination scale, 45 ft. long, on which both narrow and broad gage cars may be weighed. The rail used is 80 lbs., and all the special track work is built according to Reading standards.

The storage yard tracks are built on 75 ft. centers, and the approved height for piling ties is 24 ft. The capacity of the yard is 600,000 ties, 4,000,000 ft. of switch timber, and 4,000,000 ft. of lumber and piling. The yard layout is designed to provide for additional storage capacity on the west side.

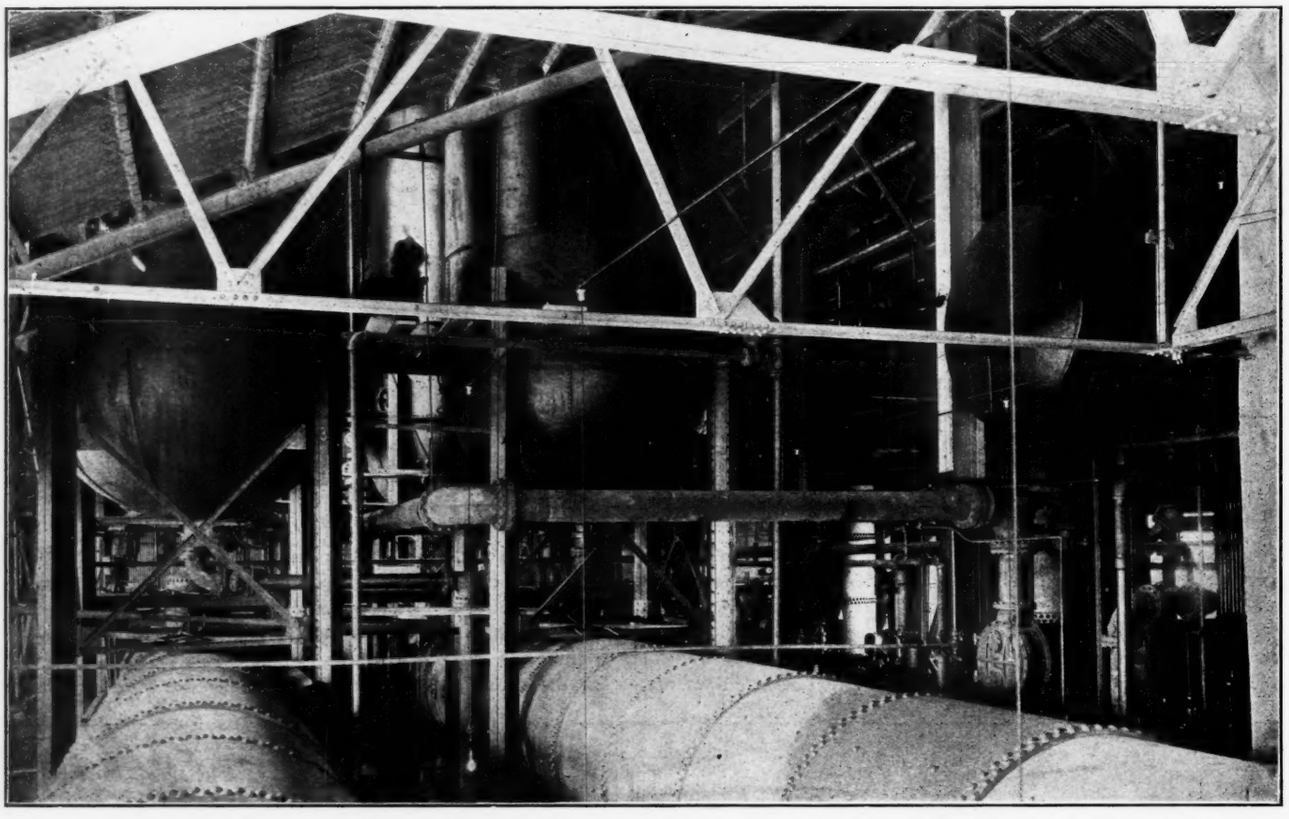
The arrangement of piling ties is shown in an accompanying photograph. The apron effect along the tie piles comes from the fact that the ties are loaded onto the piles by a locomotive crane and the rear end of the crane swings over the apron. A distance of 4 ft. is left between each tie pile. As the prevailing wind is east and west, the ties are piled so that the alleys along the different tracks correspond with each other, thereby increasing the east and west circulation. This view also shows the type of tram cars in use.

The site of the plant was formerly a swamp at an elevation of about three ft. above mean high tide. The filling in of this land aided the general plan in two ways. It raised the ground level to approximately eight ft. above mean high tide and also gained a deep water channel to the new piers 4 and 5. In all, about 250,000 cu. yds. of sand and gravel were pumped by hydraulic dredges from Staten Island sound onto the swamp land. However, in many places, the yard sank and, about 3,000 carloads of cinders and ashes have been dumped on top of the sand. The result is a very well drained tie yard, aiding greatly the quick and even seasoning of the ties and lumber.

YARD OPERATION.

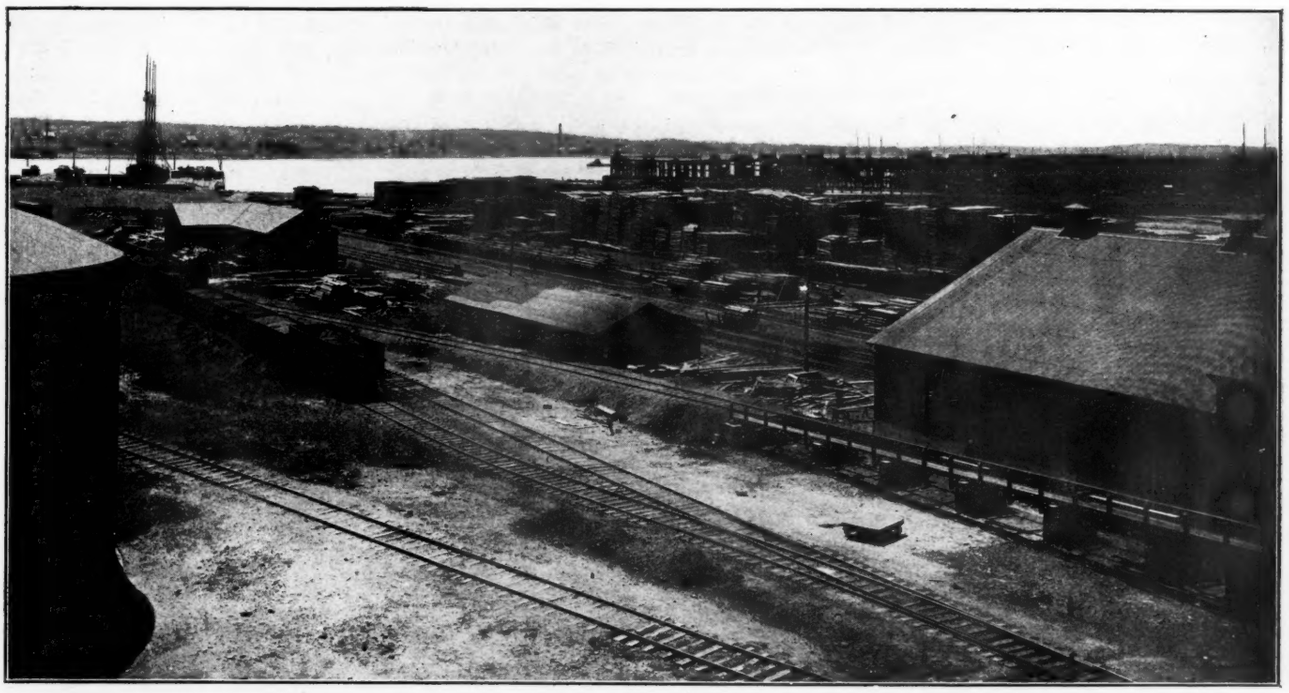
The operating equipment consists of two broad gage industrial locomotive cranes, one having a capacity of 5 tons at 42 ft. radius, and the other of 2½ tons at 38 ft. radius. The large crane unloads all treated material. As Port Reading is a very important coal exporting point, the Philadelphia & Reading has for its use an unlimited number of coal cars suitable for hauling ties to the different divisions. The Central Railroad of New Jersey also has a large number of coal and ore cars which ordinarily would go out empty, from Chrome. These cars are used for tie shipments. In loading treated material for shipment an entire sling of ties taken from one tram car are loaded at one operation of the crane. This method of handling treated material has reduced this portion of the operating expenses by nearly one-half cent per tie.

The small crane hauls the special tie cars from the piers where the ties are received and unloads the green ties onto the tie piles. The unloading of a tie vessel is shown in one of the cuts herewith. Electric hoists lift the ties out of the vessel in slings of 12 ties each and place them on the inspecting platform where the inspector examines each tie. The accepted ties are then loaded onto the special tie cars shown in the figure. When these cars are loaded, the little crane shifts them to the tie yards and unloads the ties onto the tie piles by means of slings placed around the ties. About 200 ties are loaded onto each car and the crane unloads these in six lifts. All that is then necessary is to spread the ties on the tie piles. This method of tie piling has decreased the cost 50 per cent.

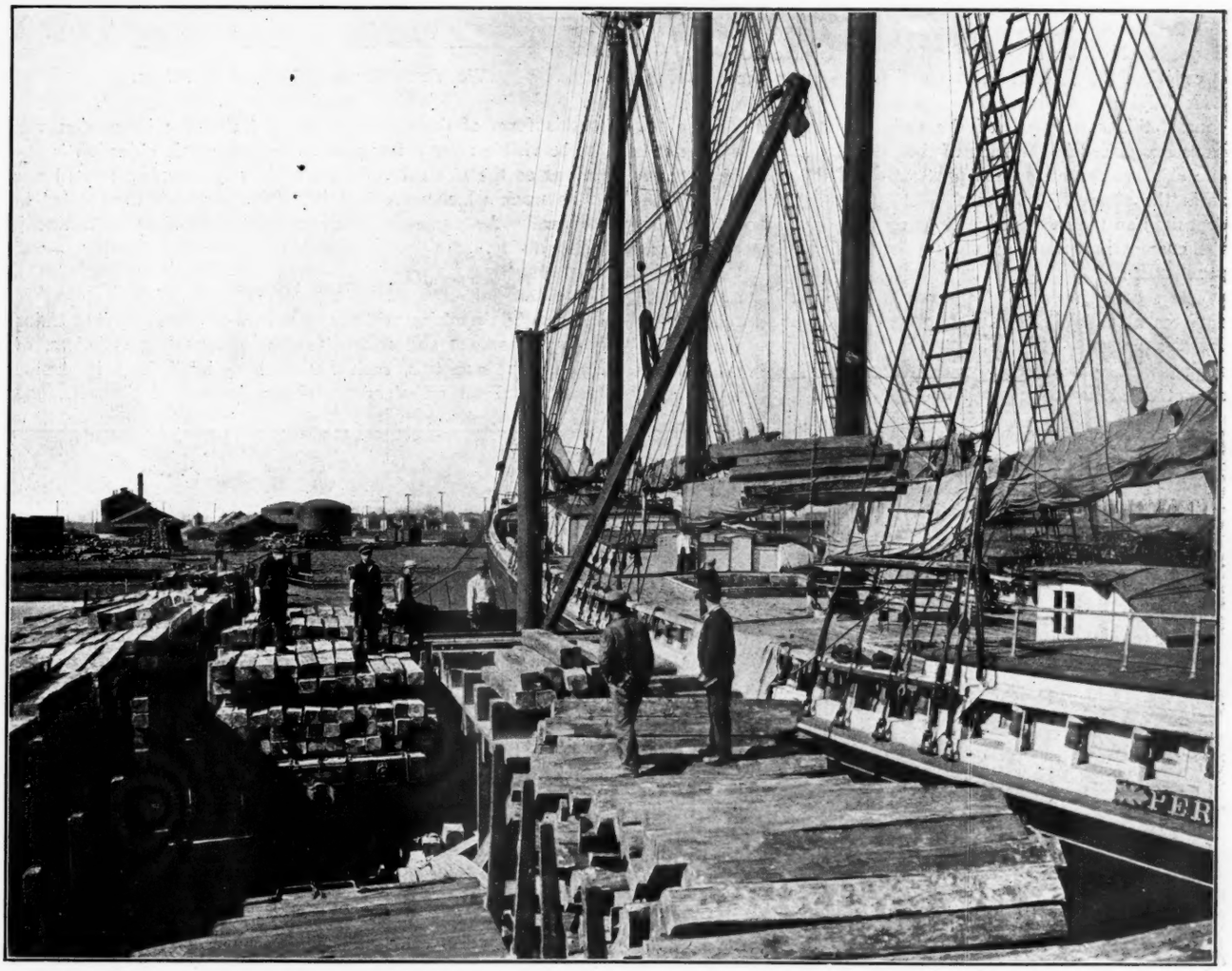


Impregnating Machinery and Measuring Tanks.

About 75 per cent. of the ties come in by water. The other 25 per cent. are secured along the two railways. The latter are inspected on the right of way, and then shipped to the plant. The majority of the cars contain several different kinds of ties and each in different sizes. These cars are unloaded in any vacant space and a separation is made into six classes as follows: Class A includes all the oaks; Class B, all the pines; Class C, beech, birch and maples; Class D, ash and hickory; Class E, gum; Class F, all ties not accepted for creosoting. These ties are then made up into slings and the small crane puts them onto their respective piles.



South Yard and Piers.



Tie Vessel Being Unloaded at Treating Plant Wharf.

For shifting the tie tram cars, a Vulcan narrow gage locomotive, weighing 27 tons, is provided. This is specially built for a creosoting plant and has curved bumpers on both ends. The tram car equipment consists of 184 tie trams, and 12 bolster trucks for timbers and piling. The tie tram cars weigh 2,700 lbs. each, and are specially built by the Orenstein-Arthur Koppel Company for the heavy service required of them. The wheels are equipped with Hyatt roller bearings. One man can move an empty tram with no difficulty, and two men handle a loaded tram with ease.

There are fifteen special tie cars for moving ties and lumber from the piers to the tie yard. They are fitted with automatic couplers, and have removable stakes. Four by four oak strips are bolted to the top of the floor to allow slings to be placed around the ties.

The treatment of the ties begins by loading the ties by piece work onto the tram cars. The average tram load of pine ties is 45 ties. In the case of pine ties, they are separated into "hearts" and "saps." All ties having 80 per cent. of heart wood are called "hearts," and are loaded onto trams separate from the "saps." This insures uniform and regular treatment of all classes of pine ties. Sawed ties are separated from hewed, and the Virginia short leaf pine is kept separate from the other sap ties.

ADZING MACHINE.

The loaded trams are then shifted to the tie adzing mill, where they are put through the tie adzing and boring machine. This machine performs four functions. First, it cuts all the ties to exact length. This cutting of a small slice from each end of the tie shows absolutely whether the tie is sound through and through. No better argument for this practice could be produced than the fact that ties are thrown out on account of rot which did not show until the ends had been sawed off. Of course, this sawing off of the ends is not possible when "S" irons are placed in the ends of the ties. By sawing off the ends one also secures better end penetration of the treating materials as in the seasoning of ties a hard, gummy substance is always deposited on the ends, which clogs up the pores. It was formerly the custom in France to cut the ends off to increase the end penetration.

The second function of the adzing machine is to adze plain surfaces at the rail bearing points. This saves all adzing after the ties are treated, thereby saving the expense and delay of adzing while placing the ties in track, and it also insures that no untreated heartwood will be exposed.

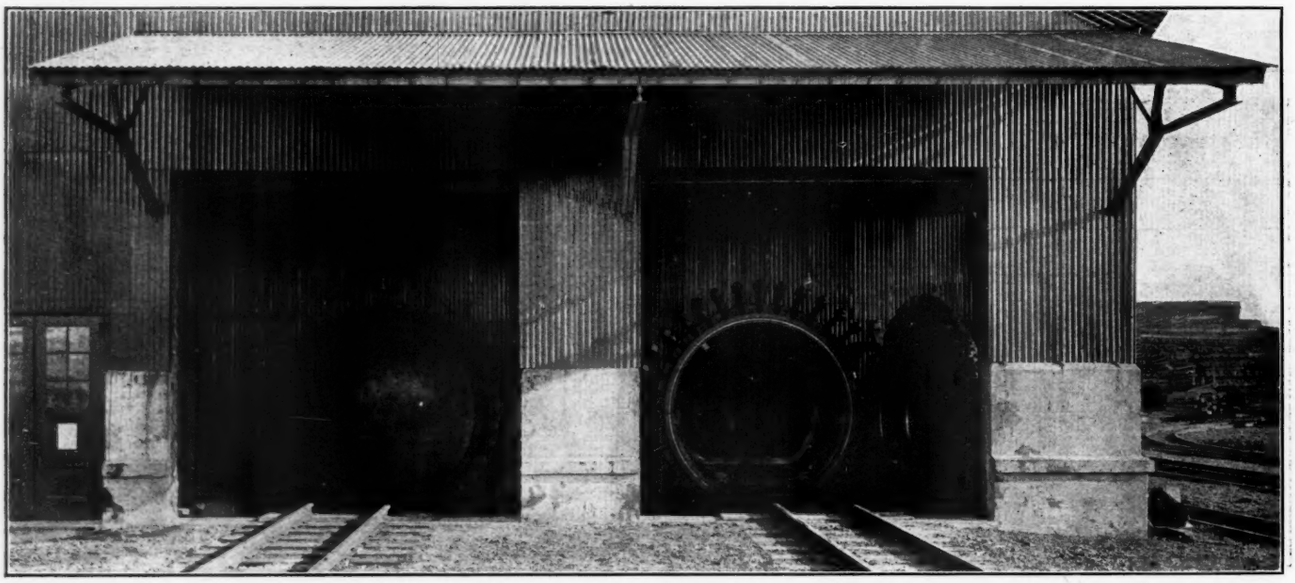
The third function is the boring of the holes for the spikes. These holes are bored through the ties so that in case any of the holes are not used they will drain themselves. The boring of these holes is an important step in the preservative treatment of ties, in that it affords treatment at the point where the heavy treatment is required, namely, around the spike.

The last function of the machine is to date the ties with the year of treatment. This is done by two pneumatic hammers, opposed, which force into the ends of the ties metal figures leaving a plainly visible print. There have been objections made to this form of dating on the ground that the impression will not be visible after a few years. However, this objection is not serious as the Central Railroad of New Jersey has treated ties in its track which were laid in 1876 and which were dated in identically the same manner, on which the date is distinctly visible today.

Tie Yard, Showing Method of Piling.

TREATING PROCESS.

From the tie adzing mill the tram cars are made up into trains of 16 trams each and shifted to the impregnating cylinders, of which there are two, each 140 ft. long by 7 ft. 4 in. inside diameter. Both cylinders are shown in one of the cuts, one



North End of Impregnating Cylinders.

closed, and the other open with a charge of ties in it. These cylinders are made of 1⅛-in. steel with 1¼-in. rivets. They are built for a working pressure of 250 lbs. per sq. in., and were tested to 380 lbs. They were built by Reeves Brothers Company, of Alliance, Ohio, and shipped by them to Port Reading, each cylinder complete, except the doors.

The treatment of all ties and timber is that called the "Full Cell" or Bethel process. Cross ties are treated with 10 lbs. of oil per cu. ft.; switch ties receive 12 lbs. per cu. ft.; framed bridge timbers also receive 12 lbs.; unframed timbers are given 14 lbs.; piling, both red oak and pine, are treated so that all sapwood is penetrated. Wherever it is possible, all ties and timbers are seasoned before treatment; however, the cylinders are so equipped that when necessary, timbers and piling may be seasoned by steaming before treatment. A saw mill has been installed to frame bridge and building material before treatment, wherever that is possible.

The power plant and impregnating building is of steel with concrete foundations. It is 165 ft. long by 72 ft. wide, with a coal pocket and approach on the east side. The impregnating equipment consists of the two cylinders, four overhead working tanks, two measuring tanks, two Union Steam Pump Company's twin general service pumps, having a capacity of 1,000 gals. each per minute, two Dean Brothers' pot valve oil pressure pumps, one 700-ft. 100-lb. Ingersoll Rand air compressor, one 100-ft. 250-lb. Union Steam Pump compressor, one Union Steam Pump dry vacuum pump fitted with a surface condenser, and hot well, together with the necessary recording pressure and vacuum gages for each cylinder and tank.

The power equipment consists of two Erie City engines direct connected to 187 k. v. a., General Electric a. c. generators; one G. E. motor-driven exciter; one Shepherd vertical engine-driven exciter; two Worthington boiler feed pumps; one Cochrane feed water heater; one American Blower Company's fan for forced draft to the boilers; and two 250 h. p. Heine safety boilers. There is also a seven-panel Westinghouse switch board.

The boiler room is partitioned off by a fireproof reinforced concrete partition and underwriters' fire doors. A stock room for lubricating oils and waste, packing, etc., and a machine shop fitted with the necessary tools, including an automatic saw grinder, emery wheel, automatic knife grinder, lathe, drill press and shaper are provided. There is also at the south end of the yard a combination engine house and blacksmith shop, fully equipped with the necessary tools. The oil is stored in two tanks, 65 ft. in diameter and 35 ft. high, fitted with umbrella roofs. Each of these tanks is fitted with a mile of heating coils, each tank having its own system, divided into four sections. All the oil tanks, both in the impregnating building and the storage tanks, are heated with exhaust steam, and there has been absolutely no difficulty in heating the storage tanks to 150 deg. Fahr., with a steam pressure of 3 lbs.

The power plant furnishes the necessary current for the motors in the saw and tie adzing mills and for the Williamson electric hoists on the piers, and for the pumping of the water into the storage tanks on Hogg Hill. The cost of generating this current is practically nothing in that all the exhaust steam from the engines is used in the heating coils in the various oil tanks.

The wiring is all installed in conduit, and every precaution is taken to avoid fire. All the oil piping is fitted with 250 lb. pressure fittings and the oil valves are the special Crane creosote valves, fitted with cleaning out pockets. The steam piping is fitted throughout with welded flanges. The heating coils in the cylinders, working, and measuring tanks are specially made radiators furnished by the American Radiator Company, and guaranteed to stand 250 lbs. working pressure.

The pipe lines connecting the storage tanks with the main building are in an underground reinforced concrete duct, five ft. high and four ft. wide. A six in. exhaust steam pipe is also run in this duct and is left uncovered. This maintains a temperature of about 100 deg. into the tunnel, eliminating any possibility of the heavy creosote oil congealing in the pipe lines.

A brick office building, 40 ft. by 41 ft., with a slate roof, contains the superintendent's office, yard office, general office, lavatory, dark room, chemist's office, and two laboratories on the first floor, and the second floor is used for a lunch room and for stationery.

The buildings, piers, and tie storage yard are fully equipped with fire protection apparatus. Two 50,000-gal. tanks are provided on top of Hogg Hill, and these tanks are connected with the fire system throughout the whole plant. The hose is placed in racks in the hose houses, which are located throughout the storage yard, and in and about the buildings.

The piers and all concrete construction were built by the railway companies' own forces under the direction of Frederick Jasperson, engineer of docks and wharves. The installation of all the machinery, boilers, oil and steam piping was carried out under the direction of the motive power department. The steel buildings were built under contract by the McClintic Marshall Construction Company. The entire plant was constructed under the direction of William Hunter, chief engineer of the Philadelphia and Reading, with C. M. Taylor in direct charge of the work.

RELAYING RAIL WITH EXTRA GANGS.*

BY J. E. TOBIN,
Roadmaster, International & Great Northern, Houston, Tex.

Rail relaying should be done by extra gangs. The foreman should be selected from among the best foremen on the division, because of the larger number of men employed in one gang. The ordinary section foremen have not had experience in handling a gang the size required to lay rail, and perhaps very little, if any, experience in rail relaying. The men which the section foreman could get in his neighborhood to make a gang large enough to relay rail would have very little, if any, experience, and would not care to continue beyond the limits of the first section; therefore each section foreman would be compelled to hire and organize a new gang, which would be found very unsatisfactory and expensive.

The section foreman has plenty of work to remove and replace material used on public and private road crossings and streets, assist the extra gang in putting in the switches and turn-outs, and space the ties under joints, so that spiking can be done to anchor the rails. In fact, the spacing of the joint ties and spiking in slots should be done by the foreman, that he may give personal attention to the tamping of ties moved or disturbed. A good foreman in charge of an extra gang should have two assistant foremen, one of whom should distribute the new rail and load old rail. I see no necessity for a time keeper. The work of relaying rail is heavy and the men should be strong and young. The nationality and race would be governed by the supply available, but if necessary to employ foreigners, the gang should be all of the same nationality.

The extra gang foreman should have experience with the class of men employed; also experience in rail relaying and be a good all-round trackman. If there is no foreman on the division having those qualifications, a foreman should be hired from outside. A gang of 100 men should relay 100 track miles in 100 days and distribute the new rail and pick up old rail with one work engine. Of course the amount of traffic would vary these figures more or less. The work engine to take the men to and from work. The conductor in charge of such work engine should have experience and qualifications necessary to handle the work train and should get the men to and from their work on time.

Ballasting or any large amount of work should be done with extra gangs, and the same arrangement would apply as in rail relaying, except that there should not be over 50 men in each

*Received in the contest on The Organization of the Extra Gang, which closed April 25, 1912.

gang, with one foreman and one assistant foreman. If a ballasting gang has over 50 men there is too much time lost getting the men started and closing up the work, when trains are approaching. The ballasting should be completed to avoid any part of gang going over the ground covered.

Get the best foremen and laborers available and pay good wages; furnish them comfortable quarters to live in and regular hours to work and eat, and the men will give good service and remain on the job.

BANK PROTECTION ALONG THE MISSOURI RIVER.

The Atchison, Topeka & Santa Fe has been doing a large amount of bank protection work in recent years between Kansas City, Mo., and Sibley, where its tracks closely parallel the

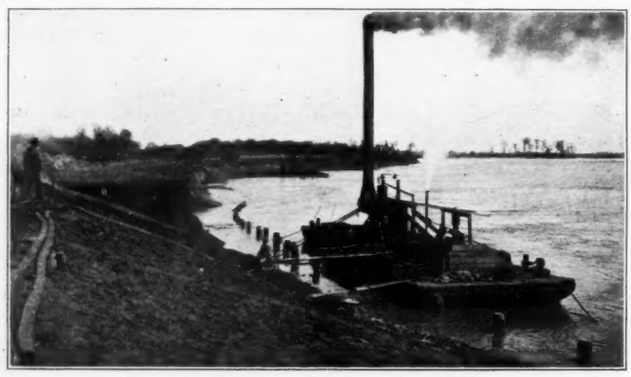


Fig. 1—Sloping the Bank by Sluicing.

south bank of the Missouri river. The larger part of this bank protection has consisted of the placing of willow mattresses from 60 to 100 ft. wide, interlaced with 3/8 in. wire strands.

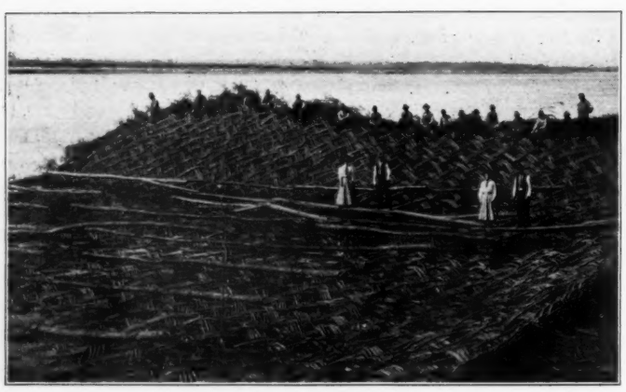


Fig. 2—Weaving a Willow Mattress.

The mattresses were loaded with riprap and sunk along the river bank. Above the mattress the bank is sloped to a 3 to 1 slope and covered with riprap. Such a mattress was put in

Fig. 3—The Completed Protection.

several years ago, just above the Sibley bridge, where the river was encroaching on the bank at an alarming rate. At this point, where a mattress 60 ft. wide x 2,100 ft. long was placed, the bank was sloped by hydraulic pressure, as shown in one of the photographs. Since this protection has been put in the bank has resisted the action of the swift current and is still in very good condition.

For some time difficulty had been experienced at another point near Congo, Mo., where the river was cutting out the toe of the slope and causing the bank to slide on a stratum of shale into the stream, carrying the track and part of the hill side with it. A mattress was placed in the stream at this point about two years ago, and it has effectively stopped this scour and sliding. Two similar slides in 35 ft. of water were also stopped by this method near Eton, Mo. We are indebted for this information to G. J. Bell, division engineer, Marcelino, Mo., under whose direction this work was done.

ORGANIZATION.*

BY GEORGE J. SHARKEY,
New York Central & Hudson River, Kingston, N. Y.

The great principle in any enterprise is thorough organization and the carrying on of the usual summer work offers no exception to the rule. Every extra gang should be under an experienced and capable foreman, who should be consulted by the roadmaster in the selection of his assistant foremen. If the assistants are not pleasing to the foreman in charge a certain friction arises and the work suffers. The foreman should be supreme over his particular force in settling little disputes with the men. He may, of course, consult his superior, but the decision brought before the men should bear the outward appearance of coming from the foreman, thus strengthening the position of the foreman among his men. Just as soon as the men have the least inkling that they can get redress at the office the organization suffers a setback.

The force should be sufficient for the work in hand for without the necessary help the work is not only held back, but no opportunity is given for the foreman to show his true ability. The following is what I believe to be a good force for laying 80 to 100-lb. rail: One general foreman, two assistant foremen, two flagmen, eight adzemen, sixteen tongmen, ten spike pullers, ten spikers. eleven men following up, lining, gaging and doing miscellaneous work.

The flagmen should be supplied with velocipede cars to secure quick movement between gangs and the nearest block stations in order to keep in touch with the movement of trains. The following organization is a good one for a ballast gang: One general foreman, two assistant foremen and 45 men. The gang should be divided between jack men and raising and surfacing forces, as the conditions warrant.

The prompt delivery of good tools, the furnishing of information regarding grade stakes and other engineering items, and prompt and intelligent information regarding the running of trains, are points in which other departments can co-operate with the track department to excellent advantage.

The track work should always be followed in its entirety to completion, and the foreman should be able to advise his superior when he has finished a piece of work that it is entirely completed. It is the going over and over work that costs.

A certain degree of conservativeness must be maintained by the foreman of an extra gang, not approaching the usual familiarity that exists between the section hand and his superior. The foreman should keep a well-defined line between himself and the men. The roadmaster should be a criterion for conservativeness, and while he should be present almost daily on the work, should not linger for any length of time, but show that he may be expected at any time.

*Received in the contest on The Organization of the Extra Gang, which closed April 25, 1912.

THE NEGRO AS A TRACK LABORER.*

The Second of a Series of Discussions of the Characteristics of the Various Types of Maintenance Workmen.

METHODS OF HANDLING NEGRO TRACK LABOR.

BY F. E. LAWRENCE,
Supervisor, Central of Georgia, Macon, Ga.

The elemental characteristics of the negro laborer which differentiates him from any other class of labor are his natural nomadic instinct as regards work and his absolute improvidence. It has long been known as an established fact among employers of negro labor that the possession of money above a certain limited sum—which ranges around the $2 mark—makes the negro lose all interest in work. It seems to be a necessary part of his life to stop work and spend that $2 before any thought of further effort enters his mind. When labor was rated at 30 to 50 cents per day it was possible to obtain from him the greater part of the week's work, but with the present rate of $1 to $2 per day the problem has become one that may seem simple to a mathematician, but which is calculated to generate a dispeptic disposition in the track man or the contractor who has work piling up and no one to do it. This applies to the negro as a class, although there are, of course, rare exceptions.

Our plan with respect to section labor is to employ as far as possible, men with families, and to allot to each man enough right-of-way to provide himself with a sufficient garden, and if he wishes, some land on which he can raise a small crop of corn or cotton. His women folks and children cultivate this land for him. We are further providing good, substantial, netted wire fences to enclose the house and ground. This plan is partially successful, but as often as not, he "gits a notion" or the wanderlust overcomes him, and he moves off.

In obtaining and retaining negro labor more depends on the foreman than can be said of any other class. A man brought up to work Italians, Greeks or Mexicans would be unable to cope with the negro. He has the intellect of a child and must be treated accordingly. He is not apt to stay on the job long if he is not allowed certain privileges, such as attending "relatives' funerals" or spending Saturday evening in town. An occasional pass makes him feel important among his friends.

The foreman must be a despot in that his word is absolute law. If a foreman allows a negro to argue a point or to hesitate in carrying out an order the foreman's value to the company is gone. When a negro gets into trouble about gambling or drinking or gets in debt and the county holds him for the "gang" the popular foreman will pay him out and collect his investment in monthly installments. The fact that he can borrow a dollar when he wants it is alluring to him, for he does not consider the advent of pay-day.

We run a commissary train monthly over the line which supplies "rations," shoes, clothing, tobacco and other staples and every man is allowed to trade with the company to the extent of the time he has to his credit. This feature is very popular, because each can always get what he wants off the supply train without paying cash which seems to him like getting it free. It is deducted from his time when pay-day arrives, but he does not miss the money that he has never received and what he gets is a surplus to be disposed of at once. It is a regular thing to have a very small gang for one or two days after pay-day, but as soon as the negroe's money is gone he wanders back to his gang.

The section laborer is naturally much more stable than the extra-gang laborer, as he is obtained from the country in the vicinity of the section headquarters, but he must divide his time between farming, railroading and hanging around, and the aggregate of his service is not great. On the other hand, extra gang laborers are liable to stick to railroading, but shift from gang to gang as the impulse strikes them. This creates a balance to a certain extent, but the time that he must take to go to town to spend his wages reduces his average time to that of the section hand. Here is where the foreman who is popular with his gang has an advantage over those of his fellows who are not so popular. Labor drifts to the foreman who has a favorable reputation, and his gain is often another foreman's loss. We cannot interfere by sending this labor back to the gang it left or by refusing to employ it on the gang to which it has come, for competition for labor is keen and it would go elsewhere.

The negro has no initiative and if left to do a piece of work with no direction from a white man will probably leave it undone. Where the white man leads the negro will follow, and his best efforts are exerted under the stimulus of the active leadership of his white superior. A hand lent occasionally will spur him on to further effort, as he does not want to be thought deficient physically as compared with his white boss. To work the negro successfully he must be well fed and kept contented. Rations in plenty is the greatest source of happiness with him, and when the nights are cold a good fire in the camp car around which he and his company can collect to swap yarns or indulge in other more expensive amusements is his delight. "Sufficient unto the day thereof," he lives with no thought for what the morrow will bring him and so long as he has a full stomach and a new jumper he is at piece with the universe.

The foreman must keep a close watch over his gang constantly, for as long as the negro knows he is under the critical eye of his boss and that an ever ready driver is at hand at any moment to stir him up he will exert himself. Negroes should be worked as much as possible in small gangs so that the entire gang can perform every movement in unison. When silence reigns one may know that everything is not right, for in order to work well he must sing or be ready with his grunt as an accompaniment to the singing leader. His whole soul and being is clothed in rythmn, and his inspiration is song. Keep him laughing and singing, and he will give in return the most efficient service that is possible with so inefficient a machine.

*Three articles in the *Railway Age Gazette* of June 21, 1912, page 1568, discussed "The Hobo as a Track Laborer."

ADVANTAGES OF THE NEGRO TRACK LABORER.

BY P. H. HAMILTON,
St. Louis and San Francisco, Pittsburg, Kan.

The negro is not well adapted for tedious work as he likes to work fast, and is apt to slight work that is necessarily painstaking. He has a preference for big jobs. He likes the "hip, hip, hurrah!" style of foremen; that is, he prefers to work for the foreman who handles his men as if he were giving orders to a regiment of soldiers, the foreman who shouts his orders, and is firm without being blasphemous. Possibly this is because the negroes are a noisy class of workers. All kinds of track work, even tamping ties, is carried on in rythm in harmony with a noisy tune chanted by some of the men in the gang.

For rail laying negroes cannot be beaten. They are strong and quick to act and can handle more rail per day than any of the various foreign gangs. In an average gang a number of expert spikers can always be found. A favorite way of using the spike maul is "short dogging." A negro spiker will cut six to ten inches from the end of a standard spike maul handle and then grip the handle at the end with both hands, swinging the hammer in a complete circle when striking the track spikes. In this way he can hit two heavy blows to one by the common method. It is interesting to see six negroes lined up on a piece of track spiking this way.

Climate does not seem to bother the negro. He can work in

winter or summer, rain or shine. He can do efficient work in the hottest weather. I have seen negroes handling rails without any hesitation, in July and August, when it was almost unbearable for one to lay his hands upon them.

One strong factor in favor of the negro laborer is the speed with which he executes his work without danger from personal injuries. The number of personal injuries among negro laborers, when compared with other classes, is very small. This is certainly due to the "straw boss" or unison man. In a negro extra gang the unison man is always present, and for each class of work he has a different rhyme which he chants in a loud voice; and all the men move in unison. In handling rails or heavy material every man lifts at the same time and lets go at the same time; and as every man lifts his own part of the weight there is little chance for injury.

The negro has the stamina, strength and courage to do heavy work. Unlike most foreign laborers he feeds himself on good substantial food, and is always in fit condition for work. In a foreign gang there is always a number of ill-fed weaklings who cannot do a good day's work; and because of their clannishness it is sometimes necessary for the foreman to keep these drones to hold the gang together. The foreman can weed out a negro gang whenever he sees fit.

It is not necessary to have as much supervision with a negro gang as with a foreign gang. Negroes work uniformly and when once told how to do anything continue to do it that way. Instead of watching the minor parts of the work the foreman can devote his time to pushing the whole of it along. When set to doing one class of work the negro will stick patiently at it until assigned to something else. The negro's ability to understand English makes it possible for the foreman to give him personal instruction. This alone makes him preferable to the foreigner.

STRICT DISCIPLINE NECESSARY WITH THE NEGRO TRACK LABORER.

BY A. O. WILSON,

Division Engineer, Seaboard Air Line, Hamlet, N. C.

In the south the negro is relied upon almost exclusively for track labor, and upon the manner of handling him depends the success, progress and cost of construction and maintenance work. Negro track laborers are divided into two almost distinct classes, the extra gang laborer and the section laborer. The extra gang laborers are generally young, unmarried men, who have more or less of a roving disposition. A large per cent. of them work only long enough with one gang to make a "grub stake" and a little "crap" money and then depart for other work. In order to retain a good gang of negroes two things are necessary—a good foreman and a good cook who will serve plenty of plain but wholesome food.

Negroes are accustomed to looking up to a white man, and for this reason a foreman must be of quick judgment, fair, just and absolutely firm, and must maintain strict discipline. Another very essential thing, which is familiar to those who have handled negroes and may sound strangely to those who have not is that a negro be kept impressed with the fact that he is a negro. This does not necessitate harshness or ill treatment as many may suppose—far from it. It must be done kindly but firmly. If one expects to keep authority over negroes, he must avoid familiarity, for nothing will ruin a negro more quickly. He simply cannot stand it. The section laborer as a rule is quite different from the extra gang laborer in his habits. He is usually married, or wants to get married and settle down in the section quarters where he will remain for years if the wage schedule is fair, and the quarters are comfortable. It is a good plan to provide enough ground at the quarters for a small garden, for the negro is naturally a farmer.

The negro is very susceptible to flattery, and this weakness can be taken advantage of with good results, if one knows how and when to do it. As an illustration of this an occasion arose on some work recently where 75 men had to stand idle while 10 men worked. Of these 10 men, one man's lot was twice as hard as any of the others. A good man was placed in this position and the foreman then commenced to brag on the gang in general, but the man in the hard place in particular; the result was wonderful. These men did more work in 30 minutes than would usually be done in two hours. The man who had the hardest job did more work than any other two, and each exerted himself to his capacity, which is a good deal from a healthy negro.

The negros are usually faithful and loyal, and become very much attached to their foreman. They come to regard his word as their law, and regard whatever he may have to say as just the proper thing without question, this being especially so with the section laborer. The negro takes a great interest in rivalry, and can often be spurred to greater efforts by pitting one gang against another. I once increased the amount of rail laid per day 300 per cent. by sending daily comparative statements to each gang, which were read to the men by the foremen.

THE IMPORTANCE OF A GOOD FOREMAN FOR NEGRO TRACK LABORERS.

BY W. J. EDWARDS.

Roadmaster, Alabama Great Southern, Birmingham, Ala.

Born and bred in the South, I know the colored people as they are, and no man can know the negro unless he has been acquainted with him from infancy up. I learned much about the negro from my old black mammy and the little negro children in my childhood.

Negroes are roughly divided in two classes. The larger class is massed in the towns and cities, too often despising and shirking work except as compelled to it by sheer necessity. The other class consists of those who are not ashamed of any kind of work. The significant thing is that those who want work and are doing it are commonly the negroes with little or no education, while those who are shunning work are usually of the so-called educated class.

The negro as a rule differs as much from the white in mental as in physical characteristics, though there are many individual exceptions. He is very receptive, and in that which requires imitation he is well developed, but in that which requires independent thought he stands on a low stage. He is of a superstitious temperament, believing in witches, charms and evil spirits. In general, he is lively, excitable, passionate and fond of music and display.

About 95 per cent. of the track laborers on the Alabama Great Southern are negroes—the best labor we can get in the south, because they can stand more heat, cold and hardships of all kinds than the white man. To obtain the best results, the foreman must understand every phase of the work and be experienced in handling this class of labor. He must be fearless, of careful judgment and absolute justice. He must deal with trackmen as master with servant—never engaging in anything bordering on a social feature. The negro is quick to detect the slightest tendency in this direction which weighs heavily against his respect for his foreman, as well as robs him of his greatest inspiration to do his best. He is childlike in his obedience to the foreman he fears and I might say, loves and respects him. When this is the case, the foreman can accomplish tasks in an unusually short time and in the most satisfactory manner. The negro is a fine imitator and only requires the direction or supervision of a foreman possessing the requisites to get the best results.

We have a number of negroes on this division who are honest, loyal, hard working and intelligent laborers. They have been in the service of the company for a number of years and can do good track and bridge work. One man has been in service as a laborer for over 26 years, who does good section work now and seldom loses a day. On a number of sections from two to

three negro laborers have worked for several years, and are as reliable and competent, as well as loyal, as could be desired.

The scale of wages does not cut much figure. Generally, if the negro can make enough to clothe and feed himself and family he is satisfied. If he can live on $1.25 per day, he will work six days in the week. On the other hand, if his wages are $2 per day, he will not work more than three or four days; in other words, after he has provided himself with a red tie, derby hat, tan or patent leather shoes and the latest in a suit of clothes.

Referring to negro laborers on extra gangs, the best results can be obtained by first providing wholesome food and lodging cars, then treating them fairly. In addition to this, it is necessary that the foreman arrange to advance to a number of his laborers 50 or 75 cents per week and probably more, especially if he is camped in a town or city where the negro can "show his dusky rose a time." Unless the foreman will let him have money occasionally, as mentioned, or the company pays him weekly, it is impossible to keep a sufficient force to do the work required of either a section or an extra gang. It is a fact known by all competent southern track foremen that this is true. As a whole, the negro, if properly handled, cannot be excelled as a track laborer for the southern states.

UNLOADING COAL FOR STORAGE.

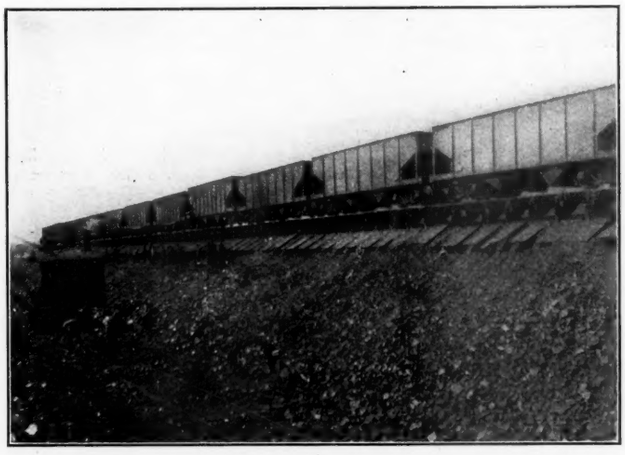
The unusual demands for coal during the early spring of 1912 in anticipation of the coal strike made necessary the storage of about 250,000 tons in the Hawthorne yard of the Chicago, Burlington & Quincy, just outside the city of Chicago. A trestle about 2,000 ft. long and about 12 ft. high had been used in former years for elevating bottom dump cars, but on account of the labor required to move the coal dumped from this trestle it was desired to improve upon this plan. This year after the trestle had been filled with coal a string of 50-ton flat cars was placed on it and a track laid over the decks of these cars with a run-off at one end blocked up on timbers. This track was raised about 3 ft. above the decks of the cars on 12 x 12 timbers, making the top of the rail on the elevated track about 19 ft. above the ground. Between the blocks supporting this track flat wooden chutes made of 1 in. boards were spiked, as shown in one of the photographs, in order to throw the coal over the pile. Clamshells were operated along the tracks at each side of the trestle to throw the coal over on to adjoining piles. The coal was dumped ahead of these clamshells and allowed to fill over the tracks on which they were operated. This coal was all thrown over on the adjacent piles and the dumping was then started behind the machines, and they were reversed, working back through the pile. When the coal was all stored the decking was torn off and the flat cars were pulled out. As the scheme was devised under the stress of necessity little thought was given to making it permanent, but it has been suggested since its operation was so successful that it would be a source of regular economy to construct a deck for such a string of flat cars which could be taken off in sections and replaced rapidly and cheaply. By the use of such a deck the flat cars could be shifted from one pile to another, allowing the height of such piles to be greatly increased. This method of unloading was conceived and worked out by X. H. Young, terminal superintendent and H. Bloom, roadmaster.

Construction of Unloading Track on Flat Cars and Run-Off.

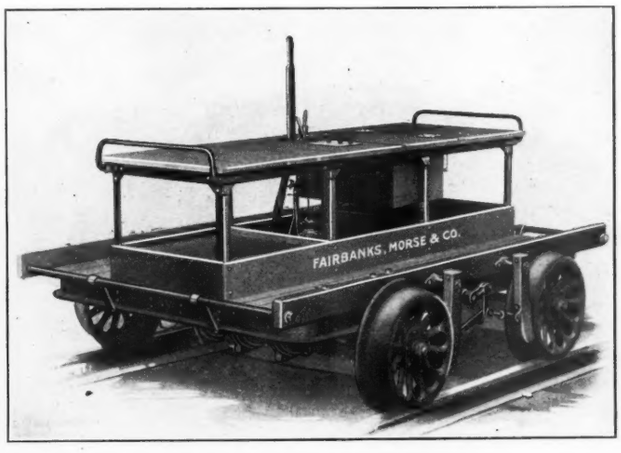
MOTOR CAR FOR HEAVY GRADES.

A gasolene section motor car that will negotiate grades as heavy as 3 per cent., and carry a full load has recently been placed on the market by Fairbanks, Morse & Company of Chicago. A number of these cars were recently ordered by the Sierra Railway of California, this railway requiring a very powerful car for their use, not only because of heavy grades, but on account of the terrific winds that sweep the ravines. The power of this car is shown by its climbing a 3 per cent. grade with a load of 9,300 lbs.—the equivalent of 60 men of average weight.

This car is built with all steel frame, and is equipped with a three-cylinder two cycle, air cooled engine direct connected to the rear axle, which is integral with the crank shaft and made of nickle steel heat treated. The only moving parts are piston, connecting rods and crank shaft, all of which are en-



Clam-Shell Transferring Coal to Adjacent Storage Pile.

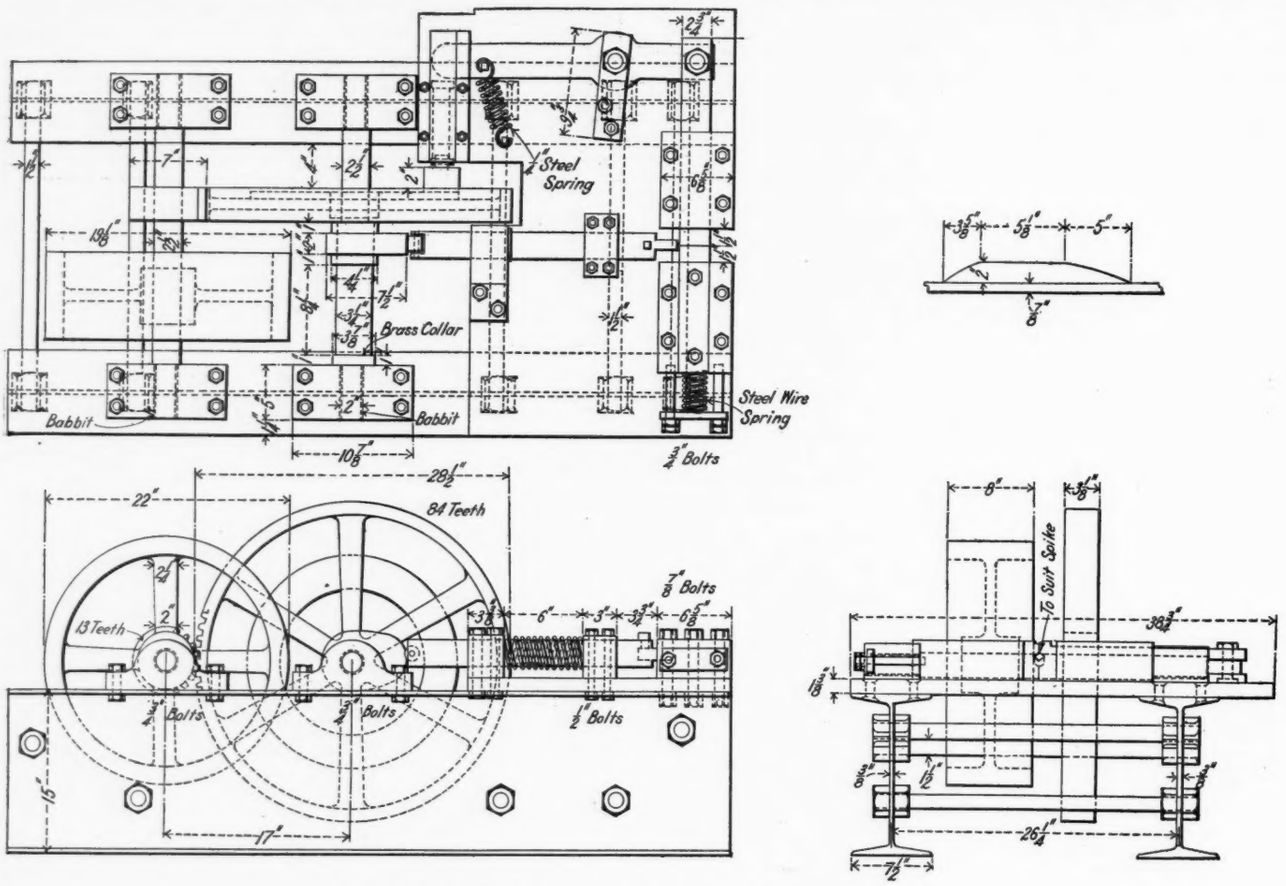


Motor Car for Heavy Grades.

closed. Being of the two cycle type the engine has no valves, cams, pawls, etc., which holds the upkeep cost of the minimum and makes it an easy matter for the section man to master it quickly and operate it successfully.

SPIKE STRAIGHTENING MACHINE.

A spike straightening machine has been designed and built in the Spencer shops of the Southern Railway, and is now in use at the roadway shops at Charlotte, N. C., for straightening track spikes which have been badly bent in service and are of no further use in their present condition. As shown in the accompanying drawing, this machine has two dies for straightening the body of the spike and a header for squaring up the head. It is a belt-driven machine and can be run at any desired speed. The spikes can be straightened either cold or hot.



Spike Straightening Machine in Use on Southern Railway.

It does not matter how badly the spikes may be bent, after being straightened they are practically as good as new ones. This machine straightens from 1,500 to 1,800 lbs. of spikes per day of 10 hours, at a cost of $1.25, the machine being operated by a boy who is paid from 10½ to 12 cents an hour. The saving amounts to about $1.50 per 100 lbs. of spikes. We are indebted for this information to E. Fuller, shop superintendent of the Southern at Spencer, N. C.

A concession has been granted for the construction and operation of a railway from Buenos Aires, Argentina, via Reconquista, to Bahia Blanca. This line will have the following branches: One from San Vicente to La Plata; one from Monte to a point on the Bay of Samborombon, and one from Reconquista to Mar del Plata. The gage of these lines has not yet been decided upon.

ABSTRACT OF ENGINEERING ARTICLES SINCE MAY 17.

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the regular weekly issues of the *Railway Age Gazette* since May 17:

Pavements for Team Tracks and Freight House Driveways.—The subject of pavements has become a very specialized one and railway engineers are frequently confronted with the necessity of deciding on the type of pavement to be installed without having had experience to guide them in the selection of the type best suited to the needs of a railway yard. An editorial in the issue of May 24, page 1144, discussed the types of pavement most suitable for the heavy traffic conditions which are common in railway yards and gave the principal advantages and disadvantages of each. S. Whinery, consulting engineer, New York City, was the author of a letter on this subject which was published in the issue of June 28, page 1594.

Bascule Bridges over Buffalo Ship Canal.—The improvement of an important highway connecting the city of Buffalo with the town of Lackawanna made advisable the separation of grades at the crossing of this highway with the Buffalo Creek Railroad and the Buffalo ship canal. Two new bridges were required, the building of which involved some interesting foundation work. An article by Emile Low, which gave an authoritative description of this work, appeared in the issue of May 24, page 1148.

Embankments and Foundations on the Toronto-Sudbury Branch of the Canadian Pacific.—The method of anchoring an embankment across a muskeg and the method of replacing a bridge abutment demolished by a slide of the adjoining fill were described in the issue of May 24, page 1158.

Harriman Lines Spokane-Ayer Cut-Off.—The building of the Oregon-Washington Railroad & Navigation Company's lines between Spokane and Ayer involved some unusual construction difficulties and some extremely heavy work. The line was built to a very high standard and its importance in the securing of competitive traffic makes the description of this cut-off particularly interesting. A fully illustrated article on the construction features of the new lines appeared in the issue of May 31, page 1187.

The New York, Westchester & Boston.—The New York, New Haven &

Hartford has built the first electric line in this country which is constructed to the standards of a first-class steam railway. It extends from New York City north to New Rochelle and White Plains. Some very interesting details of the construction of this line were included in an illustrated article in the issue of June 7, page 1229, and an editorial comment concerning the policy of building this line and the traffic which it will handle appeared on page 1125 of the same issue.

Inspection of Rail Manufacture.—Robert Job, Chemist of the Lehigh Valley, was the author of a Letter to the Editor published in the issue of June 7, page 1227, which described a method of increased inspection of rails which was developed on the Lehigh Valley in the fall of 1911.

Relation of Temperature and Section to Rail Failures.—The fact that the new A. R. A. section rails are giving very much improved service as compared with the older sections, and also the fact that rail failures are almost inversely proportional to the temperature, is indicated by a plot of the rail failures per hundred miles of track covering the entire Harriman system for a period of three years. This plot was reproduced in the issue of June 17, page 1337.

A Contractor's View on Railway Contracting.—Some very pertinent comments on the difficulties which a contractor meets in attempting to do work at a fair price in the railway construction field were published in the issue of June 14, page 1345, and an editorial discussion of the same subject appeared on page 1329 of the same issue.

The Little Salmon River Bridge.—The construction of the National Transcontinental Railway, which is being built by the Canadian government from Moncton west, involved the building of a number of long, high steel viaducts. The one over the Little Salmon River is typical of this class of construction on this road and is interesting for several reasons. The use of through girders on so high a viaduct is unusual, and the methods of erection adopted were economical. The fact that the work was done under government supervision made it possible to present complete and accurate cost data. The description, which was prepared by R. F. Uniacke, the company's bridge engineer, appeared in the issue of June 28, page 1603.

The Impact of Flat Wheels upon Rails.—Prof. C. H. Benjamin, dean of the School of Engineers, Purdue University, has developed and is using experimentally a machine for measuring the blows of flat wheels on rails. The possibilities of securing important data from tests of this kind are evident and the results of tests to be made during the coming year will be watched with interest. Prof. Benjamin's description of this machine appeared in the issue of June 28, page 1613. A Letter to the Editor on this subject was published in the issue of July 12, page 43.

Two Railway Extensions in Ontario.—Railway lines are constantly being built through unbroken territory in the Dominion of Canada and such construction involves work which is becoming unusual in this country. The Algoma Central & Hudson Bay and the Algoma Eastern are two lines which have been built under such conditions and the construction of which is of general interest to engineers. R. S. McCormick, chief engineer of these lines, has written an interesting description of the construction work, including some cost data and a number of illustrations, which was published in the issue of July 5, page 9.

Construction of the Panama Railroad.—In view of the interest that has attached to the building of the Panama Canal and the reconstruction of the Panama Railroad in connection with that work, the very complete data concerning the traffic and revenue of that road and the detailed costs of the reconstruction work just completed are of particular interest. A liberal abstract of this information appeared in the issue of July 5, page 12.

Ornamentation of a Concrete Facia Girder.—The necessity for improving the appearance of structures carrying railway tracks over important boulevards in cities has become so urgent in recent years that railway engineers in charge of such work are trying numerous experiments in ornamenting subways and viaducts. The Ogden Avenue subway in Chicago is an unusual structure in that the facia girders are ornamented by designs of Moravian tile imbedded in the surface of the concrete. A complete description of this structure, with illustrations and cost data, was published in the issue of July 5, page 17.

Canadian Pacific Passenger Terminal at Vancouver.—The Canadian Pacific has begun work on some important terminal developments in the city of Vancouver to make possible the handling of the business which the rapid growth of that city has brought. A description of the proposed passenger station and terminal layout was published in the issue of July 5, page 22.

An editorial was published in the issue of July 12, page 39, which called attention to the possibility of so designing terminal yards as to remove from the public view objectionable piles of scrap and damaged equipment.

The difficulty of securing right of way for a new line at reasonable costs and the importance of proper governmental regulation of such purchases was commented on editorially in the issue of July 12, page 39.

Rail and Water Terminals at Texas City.—A completely equipped plant for the mechanical handling of freight has been placed in service at Texas City, Tex., just across the bay from Galveston. The details of the construction of this terminal and the methods which are to be used in its operation were described in an illustrated article in the issue of July 12, page 45.

New Station at Panama.—A description of the passenger station which the Panama Railroad is to build in the city of Panama was published in the issue of July 12, page 49.

Concrete Piles.—An exhaustive discussion of the various types of concrete piles and the advantages and disadvantages of each was published in the issue of July 12, page 53.

STATISTICS OF RAIL MANUFACTURE.

BY PAUL M. LA BACH,
Assistant Engineer, Chicago, Rock Island & Pacific.

At this time, when the rail question is receiving a great deal of attention, the following statistics of the production and importation of rails in this country is of interest:

PRODUCTION OF IRON, OPEN HEARTH STEEL AND BESSEMER STEEL RAILS IN THE UNITED STATES, TOGETHER WITH THE PRICES AT PITTSBURGH FOR IRON AND BESSEMER STEEL RAILS; ALSO IMPORTATION OF IRON RAILS.

Year.	Bessemer Steel Rails. Gross Tons.	Bessemer Steel Rails. Price per Ton.	Iron Rails. Gross Tons.	Iron Rails. Price per Ton.	O. H. Steel Rails in Gross Tons.	Imports of Iron Rails in Gross Tons.
1840	.....	.....	.....	.....	.....	29,092
1841	.....	.....	.....	.....	.....	23,253
1842	.....	.....	.....	.....	.....	24,970
1843	.....	.....	.....	.....	.....	9,655
1844	.....	.....	.....	.....	.....	15,577
1845	.....	.....	.....	.....	.....	21,812
1846	.....	.....	.....	.....	.....	5,897
1847	.....	.....	.....	$69.00	.....	13,537
1848	.....	.....	.....	62.25	.....	29,489
1849	.....	.....	21,712	53.88	.....	61,753
1850	.....	.....	39,360	47.88	.....	142,037
1851	.....	.....	45,141	45.63	.....	188,626
1852	.....	.....	55,784	48.38	.....	245,625
1853	.....	.....	78,450	77.25	.....	298,995
1854	.....	.....	96,443	80.13	.....	282,867
1855	.....	.....	123,816	62.88	.....	127,516
1856	.....	.....	160,730	64.38	.....	155,495
1857	.....	.....	144,570	64.25	.....	179,305
1858	.....	.....	146,171	50.00	.....	75,745
1859	.....	.....	174,513	49.38	.....	69,966
1860	.....	.....	183,070	48.00	.....	122,175
1861	.....	.....	169,480	42.38	.....	74,490
1862	.....	.....	190,993	41.75	.....	8,611
1863	.....	.....	246,221	76.88	.....	17,088
1864	.....	.....	299,463	126.00	.....	.....
1865	.....	.....	318,118	98.63	.....	.....
1866	.....	.....	384,623	86.75	.....	.....
1867	2,277	$166.00	410,319	83.13	.....	.....
1868	6,461	158.46	445,972	78.88	.....	.....
1869	8,616	132.19	521,372	77.25	.....	.....
1870	30,357	106.79	523,214	72.25	.....	.....
1871	34,152	102.52	658,467	70.38	.....	.....
1872	83,991	111.94	808,866	85.13	.....	.....
1873	115,192	120.58	679,520	76.67	.....	.....
1874	129,414	94.28	521,848	58.75	.....	.....
1875	259,699	68.75	447,901	47.75	.....	.....
1876	368,269	59.25	417,114	41.25	.....	.....
1877	385,865	45.58	296,911	35.25	.....	.....
1878	491,427	42.21	288,295	33.75	8,390	.....
1879	610,682	48.21	375,143	41.25	8,168	.....
1880	852,196	67.52	440,859	49.25	12,157	.....
1881	1,187,770	61.08	436,233	47.13	22,515	.....
1882	1,284,067	48.50	203,459	45.50	20,325	.....
1883	1,148,709	37.75	57,994	.....	8,202	.....
1884	996,983	30.75	22,821	.....	2,384	.....
1885	959,471	28.52	13,228	.....	4,279	.....
1886	1,574,703	34.52	21,142	.....	4,692	.....
1887	2,101,904	37.08	20,591	.....	17,145	.....
1888	1,386,277	29.83	12,725	.....	4,698	.....
1889	1,510,057	29.25	9,159	.....	2,988	.....
1890	1,867,837	31.78	13,882	.....	3,588	.....
1891	1,293,053	29.92	8,240	.....	5,883	.....
1892	1,537,588	30.00	10,437	.....	3,819	.....
1893	1,129,400	28.12	6,090	.....	968	.....
1894	1,016,013	24.00	4,674	.....	1,085	.....
1895	1,299,628	24.33	5,810	.....	697	.....
1896	1,116,958	28.00	4,347	.....	705	.....
1897	1,644,520	18.75	2,872	.....	500	.....
1898	1,976,702	17.62	3,319	.....	1,220	.....
1899	2,270,585	28.12	1,592	.....	523	.....
1900	2,383,654	32.29	695	.....	1,333	.....
1901	2,870,816	27.33	1,730	.....	2,093	.....
1902	2,935,392	28.00	6,512	.....	6,029	.....
1903	2,946,756	28.00	667	.....	45,054	.....
1904	2,137,957	28.00	871	.....	145,883	.....
1905	3,192,347	28.00	318	.....	183,264	.....
1906	3,791,459	28.00	15	.....	186,413	.....
1907	3,380,025	28.00	925	.....	252,704	.....
1908	1,349,153	28.00	71	.....	571,791	.....
1909	1,767,171	28.00	.....	.....	1,256,674	.....
1910	1,884,442	28.00	230	.....	1,751,359	.....
1911	1,138,633	28.00	.....	.....	1,676,923	.....

A company has received a concession for the construction and operation of a railway between Rufino, Argentina, and Bahia Blanca and the port of Naposta, passing through Trenque, Lauquen, Guamini and Puan. From Kilometer 150 southward the government may alter the course proposed by the contractors with the latter's permission, so that the line would join one of the other lines running to Bahia Blanca, Puerto, Belgrano or Naposta.

SOME DIFFICULTIES MET IN TRACK MAINTENANCE WORK.

BY A. PALM,
Roadmaster, Western Pacific, Sacramento, Cal.

The day of the brutal roadmaster and foreman is rapidly passing. Intelligence is taking the place of ignorance, and brute force is making way for brains. A roadmaster must be a diplomat rather than an autocrat, as many of them considered themselves in former days when they made a habit of riding on the back of passenger trains and throwing off notes of censure to foremen. They always found fault and were always arbitrary in their demands. It is to be hoped that this class of men is a thing of the past.

The combination of maintenance work now handled by different departments under the section foreman is a possibility which is already being tried. The ability of the section forces to maintain signals on some divisions is being proved, and the logical next step is to add to their duties the maintenance of bridges. It is argued that we cannot maintain bridges with the poor class of labor now used on the section, and this is very true. The false economy of using such labor even for track work, however, is being realized, and eventually it will be displaced by more competent labor. One of the strongest arguments for combining bridge and track maintenance is the fact that bridge gangs are housed in outfit cars and moved from place to place, the time of moving being charged to the work. Many times moves have to be made for small jobs when the time of moving is greater than the time required to do the work.

The problem of supplying competent foremen for the future must be solved by improving the quality of labor used on the track and the working conditions of the foremen so that the position of a section man in the community will be more desirable, and young men will be drawn into the work. The best way to accomplish this is to educate the foremen. The railways could profitably issue a text book of practical formulae for computing problems in track work, giving instruction in the use of tables of sines and cosines, tangents and cotangents, latitudes and departures, radii and deflections. To make such a book valuable, instructors would have to be provided, but this is no more than the companies are now doing for other departments in the air brake instruction cars, safety appliance instruction cars and various other instructional privileges. While taking such courses the men should be made to understand that they are in line for promotion. Each one could take up in turn some part of the foreman's work. One man could handle the time rolls, another the distribution of labor sheets, another the material sheets, etc., these duties being changed from month to month. By this method the men would become interested in the work and greater efficiency would result.

One of the most vexing conditions with which maintenance of way officers have to contend is the tendency of other departments to draw on the appropriations made for track maintenance. The distribution of labor sheets will often show that 35 per cent. of the appropriation for track maintenance has been used by other departments. If other departments exceed their apportionment, or if they have work that is obnoxious, the section men are always called upon. On one large railway, although a car repair gang of 28 men was kept in a large terminal yard, the yard track gang was used to transfer bad order cars. When changes in the yard tracks were to be made the foreman had to tell his superior officers that under existing conditions he could not do the work. Upon investigation it was found that 75 per cent. of his labor distribution for the previous four months had been charged to transferring bad order cars. The foreman of the repair gang said that he could do his own transferring but that it would make his time rolls $500 a month higher, and he did not think the master car builder would stand for that.

TRAINING FOREMEN.*

BY T. W. WHITNEY,
Supervisor New York, Susquehanna & Western, Blairstown, N. J.

Each fall, at the close of the season's work, we hold what is called a foreman's staff meeting, which includes all foremen in the maintenance of way department. The meetings are addressd by the engineer maintenance of way, superintendent, division engineer and supervisor, and at the close the foremen are allowed to express their views as to the most economical methods of performing all classes of work pertaining to their sections. These meetings have been the means of building a higher standard among the section foremen, as they show the men that the railway company is interested in them and recognizes the importance of their department, which has heretofore been neglected. This stimulates the feeling among the foremen that their officers are the best officers, and their road the best road. When a foreman cultivates this feeling he works for the best interests of the company and builds up a higher standard on his section. A copy of the minutes of these meetings is sent to each foreman, and they discuss the proceedings with their men.

Each season we make it a practice to employ one man on each section who can read and write the English language, and he is allowed a few cents more an hour. The following year another man is put in the gang and the former one transferred to some other section and classed as an assistant foreman, where it was not possible to pick up a man locally to fill the position. The only way that this plan can be carried out successfully is for the supervisor to be personally acquainted with his men. Some foremen have motives of their own for not promoting men, and unless the supervisor keeps a close watch on the men in the gang, he will be unable to pick out those who will make foremen. Some supervisors are so elevated by their position that they only converse with the foremen. While this is the only proper thing to do when giving directions as to the performance of the work, the supervisor must know the men in the gang if he wants to operate his department efficiently. By mingling with them and showing that he takes an interest in them, they will work when his back is turned as they know he will give them a square deal. He should greet them with the "glad hand" instead of a scowl. "Molasses will catch more flies than vinegar."

Under the above arrangement we are able to pick a foreman from 50 per cent. of the section men, and the average might be still higher if it was not for the fact that not every man will develop the ability to handle men even if he has gained the knowledge of properly maintaining the track.

CLAY OR LOAM FOR FIREPROOFING TRESTLES.

The Chicago & North Western has used clay or loam as a fireproofing material on timber trestles with very good results. One-in. boards 6 in. wide are laid longitudinally on the ties inside and outside of the rails, and are covered with the clay or loam varying in thickness from 3 in. at the rail to 4 in. at the center of the track. It is ordinarily packed down with a shovel as it is applied, and the flanges of the wheels make a groove along the rails which carries off the water. It has been found that the floor is made practically waterproof as well as fireproof. While a number of grades of clay and loam have been used, blue clay is preferred. The application of such a fireproofing costs about 37½ cents per lineal foot of bridge. J. S. Robinson, division engineer, included in his discussion of this subject before the American Railway Bridge and Building Association his experience in removing a covering of this kind which had been in use for three years. The ties were found to be almost as good as when the sap rot was adzed off, and it was decided that they were good for two years more at least.

*Received in the Contest on The Section Foreman Problem, which closed March 25, 1912.

General News Section.

Suits have been filed against the Chicago, Milwaukee & St. Paul in the United States district court at Chicago to recover penalties for 15 violations of the 16-hour law.

The Pennsylvania announces that the sale of liquors in dining cars has been discontinued on the company's lines east of Pittsburgh and Erie. Press despatches say that the Philadelphia & Reading has issued a similar notice.

A suit has been begun by the government in the federal court at Philadelphia against the Lehigh Valley, charging violation of the law in keeping two telegraphers on duty 12 hours a day where the limit prescribed by law is nine hours.

A Zeppelin airship, the "Victoria Luise," on the morning of July 13, traveled from Hamburg to Kiel and thence over the sea, making a journey covering in all 343 miles, and getting back to Hamburg at 9:45 a. m., about nine hours after the start.

The committee of the lower House of Congress which has been investigating the steel trust is said to have agreed on a report recommending the dissolution of the United States Steel Corporation. The republican members of the committee will probably present a minority report.

Mrs. Eliza C. Hayward, who died at Chicago last week, at the age of 91, was a passenger on the first railway train run in the state of New York, that between Albany and Schenectady in the summer of 1831, which has been made familiar in the pictures of the locomotive "DeWitt Clinton."

On the evening of July 9 the Sand Patch tunnel of the Baltimore & Ohio, about 30 miles northwest of Cumberland, was blocked by the caving in of a part of the roof, and trains had to be detoured over the new line of the Western Maryland, which is parallel to the Baltimore & Ohio at that point. This trouble, which had been expected, will block the road several weeks.

The New Jersey State Canal Commission has let a contract for a survey of the route of the proposed ship canal across that state from the Delaware river at Bordentown to Raritan bay at South Amboy. The legislature of New Jersey has committed the state to the expenditure of $500,000 for a right of way for the proposed canal, with the expectation that the canal is to be dug by the federal government.

A Santa Fe Historical Society has been organized by E. L. Copeland, secretary and treasurer of the Atchison, Topeka & Santa Fe, who has issued a circular to officers and employees asking them to forward to him old records, newspaper clippings, time cards, passes and other data. An effort will be made to obtain records from every division and collect all interesting facts connected with the early history of the railway.

E. J. Scott and J. A. Allan, of Phoenix, Ariz., arrived in California July 11, after a trip around the world, which they are said to have made in 39 days, or about 19 hours less than the time made by the Paris reporter who circled the globe last year. Messrs. Scott and Allan left Los Angeles, June 1; Seattle, June 3; Yokohama, June 14; Vladivostok, June 16; Moscow, June 25; Paris, June 27; New York, July 4.

"You have 'gotta quit kickin' the public houn' aroun' if that is one of your characteristics," says H. J. Slifer, general manager of the Chicago Great Western, in a circular letter to employees on the subject of courtesy. Mr. Slifer quotes from letters he has received commending the courtesy campaign, and says, "We are not living in an age of chivalry and employees are not expected to be Chesterfields or Don Quixotes, but in dealing with the public, if you will simply 'do unto others as you would have others do unto you,' you will accomplish all that is expected of you."

The Illinois Central has announced a change in its methods of collecting tickets in its Chicago suburban service to become effective August 1. At each of the stations from Sixty-third street downtown where express service is maintained, turnstiles will be established and passengers will be required to deposit single ride tickets or have commutation tickets punched on entering the station. South of Sixty-third street conductors will collect tickets on trains, so that passengers cannot secure a ride to points further than Sixty-third street by purchasing a short-distance ticket. The platforms and passageway at the Randolph and Sixty-third street stations will be rearranged so that express and local passengers will use different entrances.

The Wabash has adopted a comprehensive plan of fuel economy. Inspectors have been placed at the different mines from which the company receives its coal and fuel supervisors have been appointed in each of nine operating districts into which the system is divided. The fuel supervisors will instruct the firemen in the best methods of firing locomotives and a scientific investigation will be made of the various grades of coal and their use in locomotives of different types. Studies of engine performance will be made and lectures on fuel economy will be given at stated periods at the various division headquarters.

The bill providing for valuation of the physical property of the railways of the country, introduced by Representative Adamson, chairman of the House committee seems likely to be discussed in Congress at the present session, the House committee on rules having adopted a rule making the bill privileged. This committee has also taken action looking to further inquiry into the relations of shipping companies with railways. The Martin bill, which aims to amend and stiffen the law regulating the hours of labor of railway employees, continues to be the subject of hearings before the House committee on interstate commerce; it does not seem likely that the committee will take definite action on it at this session.

The strike of freight handlers at the docks on the North river, New York City, has caused serious congestion in the fruit and vegetable trade throughout the past week; but the railways appear to be determined not to yield to the strikers, and it is expected that the strike will soon be beaten because of their lack of organization and money. The Pennsylvania, which brings fruit and vegetables from the southern states, appears to have been the worst sufferer. Of the 800 men at its principal pier about 600 struck. The southern roads were at once notified to accept no more perishable freight for New York, and the New York consignees have been sending their wagons to Jersey City for their freight, this process, however, causing much delay and expense. Considerable numbers of men struck at the docks of other roads, except the Erie and the Lackawanna. The Erie brings to New York large quantities of fruit from the west, and it is said its men are better satisfied than are those at other piers. Most of the strikers were getting 19 cents an hour, and asked for 23 cents. On Saturday the city food inspectors reported that they had condemned 278,000 lbs. of perishable products at the railway piers as unfit for food. The bulk of this was peaches. It does not appear whether all of the damage to the fruit was due to the strike, some of the statements indicating that the fruit had not been in good condition when it was shipped. The Hartford & New York Transportation Company increased the pay of its freight handlers about 5 per cent.

"Safety Always," on the Wabash.

General Manager Henry Miller, of the Wabash, who has appointed safety committees with duties similar to those of similar committees on other roads, proposes to call meetings of employees' families at division points. A safety committee has been organized on the Moberly division, and similar committees are to be organized on the Springfield, Decatur, Peru and Detroit divisions. At the meetings to which the wives will be invited they will be addressed by B. C. Winston, assistant attorney and general claim agent.

Impeachment of Judge Archbald.

The lower house of Congress on July 11, by a vote of 222 to one, adopted articles of impeachment against Judge R. W. Archbald of the Commerce Court. The House presented the case to the Senate, and the Senate is expected this week to vote to defer the trial until the next session of Congress.

Railway Inspection Under Difficulties.

The *Tucson (Ariz.) Star* gives the following account of a remarkable inspection trip recently made by Major Charles Hine, vice-president and general manager of the Arizona Eastern and the Southern Pacific Lines in Mexico:

"Major Charles Hine, of the Randolph lines, has returned from an inspection trip over the system and while in Mexico had varied experiences. In his travels he was forced to go on railway trains, steamboats, mules, hand car and finally a raft. The whole trip took 18 days and Major Hine stated that it was a hard one as well as an interesting one. He had no mixups with the Yaquis or guerillas, but at several times was in their vicinity.

"The hardest part of the trip was from Guadalajara to Tepic by mule back. The distance was 105 miles and was covered in three days. It was a rough trip and through the mountains all the way. The second place that Major Hine encountered difficulties was at the San Pedro river. The bridge had been burned by rebels some time before and the major thought that he would have to swim the river. Some of the section men were on hand, however, and had built him a raft of railroad ties. They were undressed and in the river when he stepped off the motor car, ready to pull him across the river. He was towed over and then rode on a pump car to the next bridge, which had also been burned. Here the men and the major carried the handcar around the sand wash and in this way the next station was made, and from which place he was able to catch a train."

Twenty-Six More Presidents Subscribe to Anti-Injunction Protest.

The presidents of 26 additional railways have subscribed to the memorial, protesting against the anti-injunction bill, which was addressed to the United States senate on July 3 and which was published in full in last week's issue, page 66. On July 9 the following was addressed to the senate:

"The undersigned having seen a certain memorial dated Chicago, July 3, 1912, addressed to your honorable body and signed by most of the presidents of western railways, desire to state that they are in entire accord with the sentiments therein expressed."

It was signed by:

Howard Elliott, Northern Pacific; C. R. Gray, Great Northern; Newman Erb, Minneapolis & St. Louis; B. F. Bush, Missouri Pacific, and Denver & Rio Grande; E. T. Jeffery, Western Pacific; C. E. Schaff, Missouri, Kansas & Texas; Thos. J. Freeman, International & Great Northern; Milton H. Smith, Louisville & Nashville; W. W. Finley, Southern; T. M. Emerson, Atlantic Coast Line; N. S. Meldrum, Seaboard Air Line; George W. Stevens, Chesapeake & Ohio; James McCrea, Pennsylvania Railroad; W. C. Brown, New York Central Lines; Daniel Willard, Baltimore & Ohio; George F. Baer, Philadelphia & Reading and Central of New Jersey; Frederick D. Underwood, Erie; William H. Truesdale, Delaware, Lackawanna & Western; E. B. Thomas, Lehigh Valley; Thomas P. Fowler, New York, Ontario & Western; Alexander Robertson, Western Maryland; T. P. Shonts, Toledo, St. Louis & Western; Jos. Ramsey, Jr., Ann Arbor; Fairfax Harrison, Chicago, Indianapolis & Louisville; Ralph Peters, Long Island Railroad; Charles S. Mellen, New York, New Haven & Hartford.

Freight Rates on the Farmer's Own Line.

No leading farmer was ever elected to the state legislature who did not feel himself thoroughly competent to "wrassle" with such trifling questions as those involved in the immediate reduction of the rates on every railway in the state. And this he feels perfectly free to do, regardless of the fact that he has no proprietary interest in the railway. It is true that the farmer does own a road, doing both a freight and passenger business. Generally speaking it is the poorest road that lies out of doors. It is the poorest built road, generally speaking, that ever happened. The road that the farmer owns runs right by his own farm. The freight rates on it are so high as to be an outrage. If the railways were as poorly built, kept in as poor repair, and charged such preposterous rates, there would be a revolution in this country. And we could have no more farmers' institutes until the farmers got back from the war. This road that the farmer owns is the common, or garden variety, of dirt road, found everywhere in America and Illinois. To haul wheat over it for the average distance of less than ten miles costs $1.80 per ton. The rate on European roads, of the same class, is only ten to twenty cents per ton. It costs more per bushel to haul wheat the average distance from an American farm to the railway station than it does to transport it from New York to Liverpool, a distance of 3,100 miles. Not being a high browed professor from a state agricultural college, I have forgotten the number of the agricultural department bulletin where I got the figures. But they're right. The unnecessary and extravagant cost of haulage on the poor country roads of this state is one of the heaviest taxes that the farmer pays. In the name of common sense why don't he reduce the freight rate on the dirt roads before he asks for any further reduction on the iron road. He owns the dirt road. He does not own the other. But he can only reduce the rates on his own road by learning from the men who have reduced rates—often under compulsion—on the iron road. He can do it by cutting down grades, by building scientific and permanent roadbeds, by building heavier and permanent bridges, by improving his motive power and rolling stock. The King road drag should be as common on the dirt road as the hand car and section gang are on the iron one.—*Prepared for committee on agriculture, Illinois Bankers' Association, by W. H. Miller, Ottawa, Ill.*

Disastrous Collision on the Burlington.

In a rear collision on the main line of the Chicago, Burlington & Quincy at Western Springs, 16 miles from Chicago, on the morning of Sunday, July 14, in which No. 8, the "fast mail," eastbound, ran into No. 2, the Overland Express, eastbound, 13 passengers were killed, 11 were seriously injured, and 17 were slightly injured. Two employees, George Bronson, engineer of the mail train and A. E. Bunch, porter on the rear car of No. 2 were killed, and the fireman on the mail train and the conductor of the passenger train were injured. The collision occurred at 6:36 a. m., in a dense fog.

No. 8 carries no passengers, but is made up of mail cars and is one of the fastest trains on the road. No. 2, the Overland Express, is a Denver train. The block system between Aurora and Chicago is worked absolute for passenger trains and permissive for freights, except in foggy weather, when it is also absolute for freight trains. The system is manual, the signals being operated from block stations, in a few of which there are women operators. There are no women operators west of Aurora. The nearest block station east of Western Springs is Congress Park, 2.3 miles away, and the nearest one west is West Hinsdale, 1.6 miles distant. Because of a crossover movement at Congress Park the block signal at Western Springs was set at stop for No. 2, but the engineman was running too fast to see it in time, in the fog, and he overran the signal so that the rear end of his train was 850 ft. from it when he stopped. Although the operator at Western Springs, Mrs. F. A. Wilcox, had not forwarded No. 2, she gave the operator at West Hinsdale the information that the block between Western Springs and West Hinsdale was clear, since No. 2 had passed out of it. This would have advanced No. 8 the length of the block and avoided a delay. There was no distant signal for the home signal which No. 2 overran. The engineman of No. 8, also approaching Western Springs too fast to see the signal in time, in the fog, also overran the signal, at high speed, and ran into the rear end of No. 2. All of the cars in both trains were of wood. The rear car of No. 2 a sleeper, was crushed, and 13 people in it were killed. The next car was derailed and its rear end was crushed in. A number of people in this car were injured. The third car was not badly damaged and was not derailed, but a number of passengers were hurt by broken glass. Train No. 2 consisted of 10 cars, train No. 8 of seven. The road is now installing distant signals in connection with its manual home signals.

There is a speed limit of 60 miles an hour on this, the Aurora division of the Burlington, applying to all trains. It is rigidly enforced and every locomotive is equipped with a speed indicator. The records of all of these indicators are checked up in the vice-president's office every day.

An all-day investigation to fix the responsibility for the accident was conducted by officers of the road Monday, July 15, at Aurora, E. P. Bracken, assistant general manager; E. S. Koller, general superintendent; Robert Rice, division superintendent;

J. A. Connell, general attorney; and W. H. Winser, chief despatcher, conducted the inquiry.

The finding of the company's officers was that the evidence showed the collision to have been caused by the failure of the flagman, John Woodruff, of train No. 2, properly to protect his train; and that the engineman of No. 8 contributed toward the accident by failing to run his train under such control in the fog as would have enabled him to see the signal.

Engineman Bronson had been in the service of the Burlington since 1889. He had a perfect record, with not a mark against him for accidents. Flagman Woodruff had been in the service about five years. He had been reprimanded on several occasions for lack of diligence in observing the flagging rule. Mrs. Wilcox, the operator at Western Springs, has been in the employ of the road in the same capacity for about five years.

It was established at the hearing on Monday that the flagman went back about 1100 ft. and that he had put down two torpedoes, probably thinking that he was soon to be called in. The engineman of No. 8 had reversed his engine and applied the emergency brake. The reverse lever was found at the back of the quadrant. Nothing was brought out which would fix the point at which the engineman shut off steam and applied the brakes.

It has been the practice on the Burlington for many years to insist that time is of secondary importance to safety, and trainmen have been instructed by rules and bulletins not to exceed schedule time in stormy or foggy weather when the signals cannot be plainly seen; and not to make up time at the expense of safety. No trainman is censured for failing to make up time or for losing time when his excuse is that he believes he has been running more safely. This is the first collision that the Burlington has had on any of its lines between Burlington and Chicago in 22 years.

The Corning and Wilpen Collisions.

The collision which occurred at Wilpen, Pa., on the 5th, proves to have been due, not to a runaway, as was indicated by early reports, but to the non-delivery of a train order. The facts as given by the government inspector will be found in this issue.

The inquest on the wreck at Corning, N. Y., July 4, was resumed on Monday of this week, and Engineman Schroeder was on the witness stand more than three hours. He said that one of the injectors of his engine had not worked well, and that he had momentarily turned his attention away from the signals. The rod which operated the injector had been caught on a part of the cab of the engine, which was loose. He had reported the defect in the cab, but it had not been repaired. The fireman, noticing that the boiler was not being properly fed, came forward to speak to him and the engineman got down from his seat to listen to him; while he was attempting to hear what the fireman said he thinks he passed the distant signal and the flagman. The fireman had just gone back to his cab when Schroeder turned around and saw the rear of the standing train ahead of him. Schroeder said that he had drunk gin on the night of July 3, but denied that he was intoxicated. Four Elmira saloon men also testified that Schroeder was sober, and three of them testified that he drank only mineral water while in their saloons. Schroeder claimed that he had reached home that night at 12:10. Klapproth, as reported last week, testified that he had seen Schroeder walking unsteadily in the street at 12:30. A lunch wagon clerk, named Janskowski, testified that Schroeder and another man were in his wagon at one o'clock, thus confirming Klapproth's statement. Janskowski thought Schroeder's companion was intoxicated, but he believed that the engineman was sober.

From reports in the *Corning Evening Leader* we glean some additional details of the circumstances connected with the collision. Mack Huntley, Schroeder's fireman, said that he stood on the running board of his engine, on the right hand side, and yet saw no flagman and no burning fusee. His testimony, given on the 9th, coincided with that of Schroeder, given on the 15th, with regard to the injector.

M. J. Holleran, conductor of the freight train which delayed No. 9, in testifying as to the fog, said that its density changed frequently. Holleran, as well as other witnesses who were on or near the freight train, testified that they did not hear the crash of the collision. Holleran said that the men in charge of the automatic block signals did not like to have torpedoes used, any more than was necessary, because the explosions sometimes disturbed the operations of the signals. The engineman of the leading engine of No. 9 testified to a conversation with Schroeder about twenty minutes after the collision. Replying to a question as to how it happened, Schroeder said that he did not know. He seemed to be all right, but was nervous. He talked intelligently. Asked if he had been dozing, Schroeder replied that he had been talking with the fireman a minute before. On the engines where the fireman works in a separate cab there is a speaking tube from one cab to the other, but words can be heard only with difficulty when the train is moving at high speed. The engineman can attend to the injector without taking his eyes off from the track ahead. Oscar Schick, the runner of the second engine of No. 9, testified that the fog on that morning was one of the worst that he had ever seen. The collision pushed his engine ahead about 30 ft. Schick asked Schroeder how it happened, and he replied as above, adding "If ever I was on the job, I was there this morning." Several witnesses testified to conversations with Flagman Lane of No. 9 as to the distance which he had gone back. His statement that it was 2,000 ft. was not shaken, except that the flagman of No. 11, who, in going back, encountered Lane, said that he thought Lane's fusee had been burning a very short time, so short that it may have been lighted after the engine of No. 11 passed it.

Flagman Lane said that he had aimed to stop about half way between the home and the distant block signals. He said that he had never been instructed by the conductor as to his duties as a flagman. He was examined on the rules at Buffalo eight years ago; had never been told how far to go back; had never been told that he must go at least a certain distance; had never received instructions when to use torpedoes or when not to use them. Asked why he did not take torpedoes when he went back, he said he thought they would not be necessary, "I sort of overlooked them, too." He did not see Engineman Schroeder's face as the engine passed, but did see his body, the engineman appearing to have bent over to look at something on the boiler. He did not see the fireman.

Conductor Sullivan, of train No. 11, testified that Schroeder had explained his late arrival at the starting point by saying either that he had been called too late or that he had not been called at all; Sullivan could not say which. Sullivan at that time noticed nothing unusual about Schroeder except that he "looked as if he had just been called." Schroeder's conversation after the collision was entirely rational.

The coroner took the testimony of a caller to the effect that it was necessary to go into the house and upstairs to awaken Schroeder, whereas on other occasions he had been roused by an electric bell.

W. B. Weatherby, signal inspector, testified concerning the condition of the signals. He did not know of any way in which a torpedo could interfere with the operation of the signals unless by a piece of tin getting into an insulated joint.

On July 16, Schroeder being called again to the witness stand, said that last spring he had been reprimanded for failing to make time in a fog between Elmira and Corning. He made further statements contradicting witnesses who said that they had seen him on the street at 1 a. m. on July 4.

Arbitration of Eastern Enginemen's Demands.

Hearings before the board of arbitration appointed to settle the controversy between the enginemen and the eastern railways began on July 15 at Manhattan Beach, N. Y. The enginemen's demands were published in the *Railway Age Gazette* of February 23. Grand Chief Stone presented the case for the enginemen, on the first day. The next day B. A. Worthington, now president of the Chicago & Alton, but who was receiver of the Wheeling & Lake Erie at the time the demands were made, presented the case for the managers. On the third day several enginemen took the stand to testify as to their work.

Mr. Stone emphasized two points. One was that the men wanted pay and working conditions standardized; that is, made the same on all the roads in the territory, and the other was that they were determined that the work of handling the traffic, whether by steam, electricity or gasolene, should be done by members of their union. He bases the request for increased wages on the ground, first, of responsibility. Each year traffic

becomes more congested and the speed of trains increases. Each year more is required of the engineer and discipline becomes more rigid. There was never as much being taken out of the individual engineman as now. The second ground is the skill required. The fireman enters the service and if he survives twelve months he gets his first examination, and the next two years he gets two more. Then he has another physical examination. If he passes he is eligible for service. Fifteen per cent. fail because of injury to the eyesight by the heat and the necessity of looking into the furnace when shoveling coal. After that he may run an extra trip now and then and keep on firing for three to five years. Many quit because they are unable to stand the strain or are dropped. Out of 100 who start as firemen, 17 become engineers. An engineman on a fast train has to locate and read correctly, in all kinds of weather, one signal every 20 or 25 seconds. The third basis for the demands is the hazard of the profession. All members of the union, he said, are obliged to take out policies in the insurance system established by it. The policies are for $1,500 each, and a member must take at least one and may take as many as three. In the thirteen years this had been in vogue, he said, the deaths had numbered 8,054, out of a membership that now numbers 72,511. Of these 2,550 were killed on duty and 91 committed suicide. Nearly every case of suicide was due to breakdown under nervous strain. The average length of life of those who died after taking out the insurance was 11 years and 7 days. There is also the hazard of loss of employment. The requirements have increased, and men are discharged for slight offenses. On half the roads a man cannot get employment if he is over 45. On the others he must be under 40, except on three, where he must be under 38.

As to hours to labor, 20 to 30 hours on duty, he said, is common. Thirty to forty is not unusual. When you come to 40, 50 and 60, and even 73 and 79 hours in continuous service it becomes criminal. The fourth ground Mr. Stone gave for the increase demanded was the service performed. The rate of pay per mile or trip, he said, was higher than ten years ago, but not in proportion to the increase of duties. Nor had they kept pace with the increases in other branches of labor. Heavier tonnage and congestion of traffic had also made it impossible for enginemen to work as much as formerly, he said. They had to lay off more for rest. The eastern enginemen now get from $3.85 to $4.15, while in the southeastern and western territory the rates are from $4.15 to $4.40. The proposed rates, while slightly higher than in other territories, he defended on the ground of greater congestion of traffic and the greater revenue of the eastern roads. The work, too, was harder, he said, and more hazardous with the network of signals in use. The enginemen in the South were also on an eight or nine hour basis, as against ten hours in the East. Derrick steam engineers in New York City got $175 a month for eight hours' work. Mr. Willard, the railway members of the commission, pointed out that the derrick engineers were working the entire eight hours, while locomotive enginemen might finish their 100 miles in two or three hours.

"Ours is more like piece work," said Mr. Stone. "If an engineman delivers 100 miles in two hours he has done a day's work."

"If you make 100 in two hours," queried Chairman Strauss, "is the strain twice as much as you experience in making 100 miles in four hours?" He said that, while a man might make his 100 miles in two hours, the speed increased the strain and the fast runs were preferred only up to a certain point, the older men taking slower runs after a while. The time between terminals is the shortest part of the work, the rest of the time being consumed in preparatory work and making out reports after the run.

He called attention to the varying rates of pay for runners on electrified lines. He said steam enginemen had a right to these runs, and that the responsibility was the same whatever the motive power. As to larger freight engines, he said that the Mallet has to be run to be appreciated. He did not think they would ever reach a scale that would pay for running a Mallet. The engineman really has the care of two engines and a longer train to keep together. Seven dollars is very low. The roads are now paying from $5.85 to $6.50 for 8 hours and 40 minutes' work. There are few Mallets used on passenger trains, and he hoped there would never be any more.

Taking up the demands for overtime, which in the case of freight trains would be computed at ten miles an hour, Mr. Stone said that all that was asked was straight pay for overtime, not time and a half. They had tried for a number of years to shorten the hours of labor by legislation, but the real cure is the penalty of overtime. If they could adopt the usual rule of time and a half he did not think there would be much overtime The engineman should be paid for thirty minutes before leaving the roundhouse, as that amount of time was required in seeing that his engine was in proper condition. When an engineman was delayed in a terminal as much as an hour beyond the time set to leave he should receive an hour's overtime. He asked similar payment for delay at the final terminal when it exceeded thirty minutes. In case of tie-ups the enginemen want to be paid for a day's work for completing their run to destination. As an example, Mr. Stone said that an engineman might be tied up thirty hours within fifteen or twenty miles of Philadelphia. He should receive a day's pay for taking the train into Philadelphia.

In opening the case for the managers, Mr. Worthington said that in 1900 the companies involved, according to the statistics of the Interstate Commerce Commission, employed 19,543 enginemen, and paid annually to such enginemen $22,191,189, or an average of $1,130. In 1910 the same roads, according to the same authority, employed 27,775 enginemen at an annual wage of $37,672,689, or an average wage of $1,360. The average yearly compensation in 1910 was 20 per cent. more than the average yearly compensation in 1900. The wage adjustments of 1910 and 1911 gave the enginemen further advances in pay resulting in an annual increase of $4,044,230, or 10.84 per cent. Similar advances were granted to all classes of employees prior to, or simultaneously with, the advances granted the enginemen in 1910. The enginemen now demand a standard rate of pay upon an increased basis and certain of standard rules of service, which, when applied against the calendar year of 1911 would have increased the enginemen's compensation on all roads $7,172,574, or 17.71 per cent., the percentage of increase on the various roads varying from 10.4 per cent. on the Bessemer & Lake Erie to 56.35 per cent. on the Coal & Coke. He named eleven roads on which the percentages of increase would be between 31 and 56. In nearly every instance this standardization will have the effect of imposing a very heavy burden on a very weak road. Poor roads that have not the same opportunity to earn the same net earnings per mile as other roads are not in a position to have a great many things that the richer and more prosperous roads have. They are unable to have block signals, they are unable to get money to get as good tracks, as high standard of bridges, as heavy rails, and other things that the richer and more prosperous roads can have, and there should be no sound reason why they should be made to pay a high scale of wages. A small road does not require as high a standard in order to be safe as the richer road, with a heavier tonnage, requires. There is not as high-speed passenger traffic. Standardization fails to recognize dissimilar physical characteristics existing on different roads and different parts of the same road. It fails to consider the varying traffic conditions represented by volume prevailing on different roads and different parts of the same road. It fails to recognize differences in wages paid labor in other employments for similar grades of service in different localities embraced within the limits of the districts involved. It fails to consider the marked variations in the net earning capacity of the several railways, necessarily affecting ability to pay proposed standard wages, such varying earning capacity being due to varying operating conditions, varying rates per ton mile, and varying volume of traffic. The enginemen recognize the force of these points, as disclosed by their claim for an increased wage, on the ground that their services must be of greater value now than heretofore, owing to the alleged larger revenue secured from the alleged increase in the size of the trainload, which, they claim, more nearly measures the productive power of their labor, which must vary on different roads, incident to the conditions I have stated. It does not seem reasonable, if they advance that as a reason why wages should be standardized, that all those roads which have the poor trainloads should have to pay as much as those that have the large trainloads. Standardization is inconsistent with demands contained in the last paragraph of the proposed schedule presented by the enginemen, providing that existing rates of pay or better working conditions shall not be reduced by the proposed rates, nor shall the general committees of adjustment be debarred from taking up with their respective managers mat-

ters not decided at this conference. If standardization means anything, it ought not to permit committees to come around to these roads after these proceedings are through with and adjust other matters that affect wages, and if the application for a standard wage scale is sincere, all of those things should be eliminated. Standardization of wages and rules of service in the western and southern territories is no justification for extending the system, particularly when it is shown that the western and southern roads were standardized as the result of a strike vote at a time when the managers felt that public policy required a temporary concession, or as the result of mediation under the Erdman act, and that the rules of service proposed for the eastern district are not in fact uniform with the rules of the western and southern districts, but on the contrary, embrace the most advantageous ones, without any compensation for the ones more favorable to the roads.

If the enginemen's wages are increased, other employees will demand more pay, as there seems to be general agreement among them as to the proper differentials between the wages of enginemen, conductors, etc. Proportionate increases to these other employees would increase the roads' operating expenses $63,000,000 a year.

On Wednesday, as mentioned above, several enginemen testified as to the details of their work.

Government Report on Wilpen Collision.

The Interstate Commerce Commission has issued the report of Inspector H. W. Belnap on the collision at Wilpen (Ligonier), Pa., July 4, reported in the *Railway Age Gazette* of July 12, page 66. The total number of fatalities was 23; 19 passengers and 4 employees. The principal facts are as follows:

The passenger train was eastbound, and consisted of a combination baggage and passenger car and engine No. 10. It was in charge of Conductor Kuhn and Engineman Dunlap. The combination car was ahead of the engine, which was backing, the passenger end of the combination car being at the head end of the train. The freight train consisted of 14 loaded cars and engines Nos. 7 and 14. It was running at between 20 and 25 miles an hour at the time of the collision; and the passenger train at 10 to 15 miles an hour. The weather was clear.

The passenger trains on this branch are not known by numbers. No block signal system of any kind is used, the movement of trains being governed by orders given by the despatcher, either verbally or by telephone, to the conductor, who in turn conveys them to the engineman and the other members of his crew. No record is kept of train orders; no train register is maintained, and the road has no printed rules of any kind governing train operation.

Conductor Knox of the freight train telephoned to the despatcher at Ligonier and asked for an order permitting him to meet the pasesnger train at Ligonier. Car distributor Noel answered the telephone and on instructions given to him by Despatcher Minech, who was working at the same desk, told Conductor Knox to bring his train to Ligonier, and that Conductor Kuhn's train would be held for him.

Despatcher Minech states that he notified Conductor Kuhn on three different occasions to hold his train at Ligonier until the freight train arrived; once while the conductor was in the baggage end of the compartment car, and twice while he was on the station platform. Freight Clerk Clopp heard the despatcher give the instruction to the conductor, while the station baggageman, William Fortney, corroborated the despatcher. Conductor Kuhn was interviewed in the hospital. He stated that he had no knowledge of the freight train having been given orders to meet his train at Ligonier. He insisted that the only instructions received by him from the despatcher related to a freight train which ran between Latrobe and Ligonier [not on the branch traversed by him]. This train was in the Ligonier yard at the time, and Conductor Kuhn stated that he was told that as soon as it was out of the way his train could go.

All of the employees connected with this accident were experienced men. It was caused either by the failure of the despatcher to deliver, or of the conductor of the passenger train to understand or obey the order. The weight of evidence seems to be with the despatcher, and the conclusion is therefore reached that Conductor Kuhn is responsible for this collision, either by his failure to understand, or by his failure to obey, the order delivered to him by the despatcher. The whole matter, however, is a question of veracity between the conductor on the one hand, and the despatcher and other employees on the other hand, since there is no written record of the order involved.

As previously stated, the combination car was being handled ahead of the engine. This is an extremely dangerous manner of carrying passengers. There was ample opportunity of turning this train at Ligonier, and there seems to have been no excuse whatever for its not having been done. With the engine ahead there would undoubtedly have been a material reduction in the loss of life.

The method of train operation on this road is extremely faulty, and until some adequate rules governing train operation are adopted and enforced, accidents of this character are liable to occur.

Master Car and Locomotive Painters' Association of the United States and Canada.

The forty-third annual convention of the Master Car and Locomotive Painters' Association of the United States and Canada will be held at the Albany hotel in Denver, Colo., September 10-13. The sessions will be held in the convention hall of the hotel. Reports will be received from the test committee and from the information committee. Papers will be presented on the following subjects: Vestibule End Finish; What is the Most Appropriate Finsh for the Interior of Vestibule Ends? What are the Essentials of a Protective Paint Making Oil? Interior Car Renovators; Would You Advise Their Use? If so, Why? The Most Economical Method of Removing Old Paint from Locomotive Jackets. The Finish and Treatment of Passenger Car Concrete Floors. Treatment and Care of Steel Passenger Car Roofs. Specifications of Standard Paint Material for Railway Equipment. The Modern Method of Exterior Passenger Car Paint, Including Priming and Surfacing. The Qualifications of the Present Day Foreman Painter. When Ash, Oak or Mahogany, Finished Natural, Becomes Stained or Discolored by Exposure to Water or Weather, Can the Stain be Removed Without Scraping the Wood, and How Should It Be Done to Obtain the Best Results? The Relative Difference in the Cost of Maintenance Between the Steel and Wooden Passenger Cars. Would You Advise Painting Wooden Roofs of a Freight Car, Considering Its Treatment After Entering Service?

Arrangements have been made for a special train over the Rock Island Lines from Chicago to Denver, leaving Chicago, September 7 at 10:30 p. m., and arriving at Denver about 10 p. m. September 9.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May, 1913, St. Louis, Mo.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, September 12, Seattle, Wash.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—W. C. Cooder, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.

AMERICAN ELECTRICAL RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; annual, November 20, 1912, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 1011 S. Michigan Ave., Chicago. Convention, March 18-20, 1913, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.
Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago.
Association of Railway Claim Agents.—J. R. McSherry, C. & E. I., Chicago.
Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, October 21-25, Chicago.
Association of Railway Telegraph Superintendents.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.
Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Meeting Dec. 10-11, 1912, New Orleans, La.
Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.
Canadian Society of Civil Engineers.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.
Car Foremen's Association of Chicago.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.
Civil Engineers' Society of St. Paul.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.
Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.
Engineers' Society of Western Pennsylvania.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
Freight Claim Association.—Warren P. Taylor, Richmond, Va.
General Superintendents' Association of Chicago.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.
International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.
International Railway Fuel Association.—C. G. Hall, 922 McCormick building, Chicago.
International Railway General Foremen's Association.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.
International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Convention, August 20, Chicago.
Maintenance of Way Master Painters' Association of the United States and Canada.—W. G. Wilson, Lehigh Valley, Easton, Pa. Convention, November 19-21, Chicago.
Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Convention, May, 1913, Chicago.
Master Car Builders' Association.—J. W. Taylor, Old Colony building, Chicago.
Master Car and Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass. Convention, September 10-13, Denver, Col.
National Railway Appliances Assoc.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.
New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
Northern Railroad Club.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.
Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.
Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
Railway Business Association.—Frank W. Noxon, 2 Rector St., New York; annual, November 20, 1912, New York.
Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.
Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.
Railway Development Association.—W. Nicholson, Kansas City Southern, Kansas City, Mo. Next meeting, Nov. 17, 1912, Cincinnati, Ohio.
Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Convention, Oct. 8-11, Quebec.
Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.
Railway Supply Manufacturers' Assoc.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.
Railway Tel. & Tel. Appliance Assoc.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.
Richmond Railroad Club.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. September 10-13, Buffalo, N. Y.
St. Louis Railway Club.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
Signal Appliance Association.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
Society of Railway Financial Officers.—C. Niquist, La Salle St. Station, Chicago.
Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, Oct. 17, Atlanta, Ga.
Southern & Southwestern Railway Club.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.
Toledo Transportation Club.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.
Traffic Club of Chicago.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.
Traffic Club of New York.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.
Traffic Club of Pittsburgh.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.
Train Despatchers' Association of America.—J. F. Mackie, 7042 Stewart Ave., Chicago.
Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
Transportation Club of Detroit.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.
Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; annual, Aug. 27-30, Chicago.
Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
Western Railway Club.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The Official Classification Committee will hold a meeting in New York City, July 23, to attend to matters which were left unfinished at the close of the long series of meetings held in April and May.

The Chicago & North Western on Sunday, July 7, put in service a new passenger train called the Golden Special, from Milwaukee to Chicago, leaving Milwaukee at 7:15 a. m., and arriving at Chicago at 9:20 a. m.

The Missouri, Kansas & Texas, St. Louis & San Francisco, Chicago, Rock Island & Pacific and Atchison, Topeka & Santa Fe, have reached an agreement for a joint up-town ticket office at Oklahoma City, Okla., to be opened in September.

The Judiciary Committee of the House of Representatives has reported favorably on the Borland bill to give the Commerce Court power to pass on errors of law made by the Interstate Commerce Commission, both in granting or in refusing to grant relief in any proceeding brought before it.

The Alabama & New Orleans Transportation Company has been organized in New Jersey to operate a fleet of several hundred self-propelling steel coal barges between Black Warrior river, Alabama, and New Orleans. The president of the company is Phineas W. Sprague, of Boston.

The Southern Railway, the Mobile & Ohio and the Queen & Crescent are running an agricultural special demonstration train over their lines in Tennessee, carrying, besides their own men, a number of lecturers from the Tennessee department of agriculture. The train consists of nine cars and stops are to be made at 65 places.

The ocean steamship lines having given notice that after September 1, next, they would give clean receipts for cotton only when the bales were in good condition and well marked, the shippers and the railways have been holding protracted conferences in New York City with a view to resisting the alleged unreasonable demands of the steamship men.

In the Supreme Court of Kings county, New York, the Long Island Railroad has secured injunctions against five residents of Bay Shore restraining them from continuing the fraudulent practice of selling or renting commutation tickets. President Ralph Peters says that although hundreds of commutation tickets have been seized and cancelled, this illegal practice persists.

Wells, Fargo & Company has announced that it will begin the publication early in the autumn of a monthly magazine, "The Wells, Fargo Messenger," intended to promote a better understanding of its spirit and method among both its employees and its patrons. Edward Hungerford, well known as a magazine writer, particularly on railway subjects, and the author of "The Modern Railroad," has recently been appointed advertising manager of the company with office at 51 Broadway, New York. He will be in immediate charge of the publication of the magazine and of the company's publicity and advertising work.

See America First Association.

The temporary board of managers of the "See America First Association," appointed at a meeting in Chicago on June 28, as previously reported in the *Railway Age Gazette*, held a meeting on July 9 in the Transportation building, Chicago, and adopted resolutions that a permanent organization is practicable, the membership to consist of all carriers, both rail and water, chambers of commerce, boards of trade, civic organizations, hotels and hotel organizations, trans-Atlantic and trans-Pacific carriers, and others interested in the See America First idea. With a view to ascertaining the sentiment and the co-operation which will be extended by the various interests, Temporary Chairman E. L. Bevington was empowered to call a mass-meeting in Chicago upon a suitable date in October and invite the appointment and attendance of delegates as follows:

Governor of each state to appoint 3, mayor of each city 1, each commercial club 1, each state hotel men's association 2, each city hotel men's association 1, Hotel Men's Mutual Benefit Association 2, American Hotel Protective Association 2, each common carrier (rail or water) 1, Trans-Mississippi Commercial Con-

gress 5, Northwestern Development League 2, Travelers Protective Association of America 5, each district travelers association 2, governor general of Canada—each province 2, president of Republic of Mexico 2, president of Cuba 2, governor of Porto Rico 2, governor of Hawaii 2, governor of Alaska 2, governor of Philippines 2, trans-Atlantic steamship lines 3, trans-Pacific steamship lines 3.

In the meantime, the temporary chairman will call meetings of the committee on Tuesday, July 23, Thursday, August 8, and Tuesday, August 27, inviting the attendance of the local representatives of the press and magazines at the first meeting, the ways and means committee of the Chicago Association of Commerce at the second meeting, and local advertising agents and managers at the third meeting, for the purpose of ascertaining the extent to which they will co-operate in the general plans of the association and the mass-meeting in October. The temporary chairman will also appoint a committee to address the Trans-Mississippi Commercial Congress on the subject of "See America First" and to enlist its co-operation and support in the movement. Assurance has been received from President Trumbull of the Congress that one day will be devoted to the discussion of "See America First" at the meeting to be held in Salt Lake City August 27-30.

The purpose of the organization is the propagation of the slogan "See America First" and the exploitation of America's scenic wonders by a campaign conducted according to well-defined policies calculated to arouse interest and promote travel throughout the United States, Canada and Mexico.

The Express Companies' Attitude.

The following statement in regard to the ruling of the Interstate Commerce Commission was issued from the office of E. T. Platt, vice-president and general manager of the United States Express, with the announcement that it had received the indorsement of all of the express companies having executive offices in New York:

"The report of the commission relates to rates and practices of the express companies. The vital thing to the companies is the question of rates. The report recommends a basis of express rates on a zone system, which is entirely new, totally replacing the present basis of rates and tariffs.

"According to the commission's report, it is conceded that the average net earnings of the large express companies from present rates are not in excess of 6 per cent. on the business done—in some cases even less. The proposed rates would drastically reduce the companies' revenue. It is, therefore obvious that the proposed rates would not produce enough revenue to cover the cost of business, especially as the changes in methods of business to be adopted will increase the cost.

"Fortunately the commission has given the express companies until October 9 to show whether the proposed rates should be adopted. The companies will meanwhile prepare statements showing what the proposed rates would produce on business actually done, which information could not have been known heretofore to either the commission or the companies.

"The question of reasonableness of the rates is one that will be decided judicially by the commission in October. The companies are not anticipating any final action by the commission that will be destructive.

"Unfortunately, the question of rates has been up to this time complicated in the investigation with that of regulations and practices, which the managers of the companies have been as desirous of changing as the commission itself. The report contains suggestions and directions as to these practices which have been made by the commission with the full co-operation of the companies.

"It is the purpose of the companies to adopt these suggestions and directions, and put them in force, with due appreciation to the commission."

Government Review of Crop Conditions and Prices July 1.

Crop conditions in general on July 1 average for the United States materially better (5.9 per cent.) than on same date last year, but somewhat lower (1.2 per cent.) than the average condition of recent years. The month of June was slightly less favorable for crops than the average June, but much more favorable than June of last year.

The aggregate area of the important crops—corn, wheat, oats, barley, potatoes, tobacco, flax, rice and cotton—in 1912, according to preliminary estimates, is 241,155,000 acres, which is 1.8 per cent. less than the estimated area of the same crops in 1911, but 1.9 per cent. greater than in 1910 and 6.9 per cent. greater than in 1909.

The condition of various crops on July 1 compared with their average condition (not normal) on July 1 of recent years was as follows:

Peaches, 124.1; apples, 115.9; strawberries (production), 111.6; kafir corn, 108.0; alfalfa, 107.8; hops, 107.1; pears, 106.4; millet, 105.3; oats, 105.2; grapes, 105.1; broom corn, 104.9; hay (all kinds), 104.7; spring wheat, 104.3; lima beans, 104.1; tomatoes, 103.9; tobacco, 103.7; barley, 102.7; sorghum, 102.3; cabbage, 102.3; flax, 102.2; cantaloupes, 102.0; hemp, 101.9; watermelons, 101.9; onions, 101.6; peanuts, 100.6; sugar beets, 100.5.

Cotton, 99.6; potatoes, 99.6; sweet potatoes, 99.4; rye, 98.1; timothy, 98.0; rice, 98.0; beans (dry), 97.8; clover hay, 97.1; oranges, 96.8; raspberries, 96.5; corn, 96.3; pasture, 94.8; winter wheat, 91.4; lemons, 91.1; blackberries, 90.4; sugar cane, 89.3.

The general or composite condition of all crops combined on July 1, duly weighted, by states, on the basis of 100 representing average conditions (for most crops the ten-year average) is as follows:

Maine, 102.7; New Hampshire, 104.5; Vermont, 102.4; Massachusetts, 99.6; Rhode Island, 93.9; Connecticut, 97.9; New York, 95.0; New Jersey, 91.9; Pennsylvania, 98.1; above division, 96.8.

Delaware, 77.6; Maryland, 107.7; Virginia, 103.4; West Virginia, 108.0; North Carolina, 101.8; South Carolina, 97.7; Georgia, 90.4; Florida, 96.7; above division, 97.9.

Ohio, 90.5; Indiana, 89.2; Illinois, 91.2; Michigan, 89.8; Wisconsin, 96.7; above division, 91.3.

Minnesota, 102.8; Iowa, 99.6; Missouri, 100.0; North Dakota, 106.3; South Dakota, 99.7; Nebraska, 96.4; Kansas, 105.9; above division, 101.5.

Kentucky, 98.9; Tennessee, 99.3; Alabama, 96.1; Mississippi, 95.1; Louisiana, 93.7; Texas, 112.1; Oklahoma, 112.1; Arkansas, 97.4; above division, 102.4.

Montana, 99.2; Wyoming, 104.7; Colorado, 109.0; New Mexico, 109.9; Arizona, 106.9; Utah, 104.3; Nevada, 101.9; Idaho, 104.7; Washington, 105.6; Oregon, 113.5; California, 98.4; above division, 104.0.

Prices paid to producers of the United States on July 1 of 1912 and 1911, respectively, averaged as follows: Corn, 81.1c., 60.0c. per bus.; wheat, 99.0c., 84.3c.; oats, 52.5c., 37.5c.; barley, 81.9c., 70.1c.; rye, 83.6c., 76.9c.; buckwheat, 86.2c., 72.4c.; flaxseed, 198.4c., 205.6c.; potatoes, 103.6c., 96.3c.; hay, $15.57, $13.99 per ton; cotton, 11.2c., 14.4c. per lb. (the average of prices of above crops, which represent about three-fourths of the value of all crops, declined 4.9 per cent. during June, whereas in June, 1911, they advanced 6.7 per cent.; they averaged on July 1 about 17.5 per cent. higher than on July 1 last year); butter, 23.4c., 20.4c., per lb.; chickens, 11.0c., 11.2c.; eggs, 16.7c., 14.2c. per dozen.

Prices on June 15 of 1912 and 1911, respectively, averaged: Hogs, $6.65, $5.66 per 100 lbs.; beef cattle, $5.23, $4.43; veal calves, $6.33, $5.72; sheep, $4.52, $4.24; lambs, $6.02, $5.51; milch cows, $45.84, $43.86 each; horses, $145, $145; milk, 22.1c., 20.6c. per gal.; apples, $1.08, $1.35 per bus.; beans, $2.62, $2.19; sweet potatoes, $1.11, $0.94; onions, $1.55, $1.34; clover seed, $11.69, $8.80; timothy seed, $6.68, $5.24; honeycomb, 14.0c., 13.3c. per lb.; wool, unwashed, 18.7c., 15.5c.; peanuts, 5.2c., 5.2c.; cabbage, $2.67, $2.46 per 100 lbs.; broom corn, $79, $69 per ton; cotton seed, $19.24, $23.38; bran, $29.35, $25.87.

Freight Car Balance and Performance.

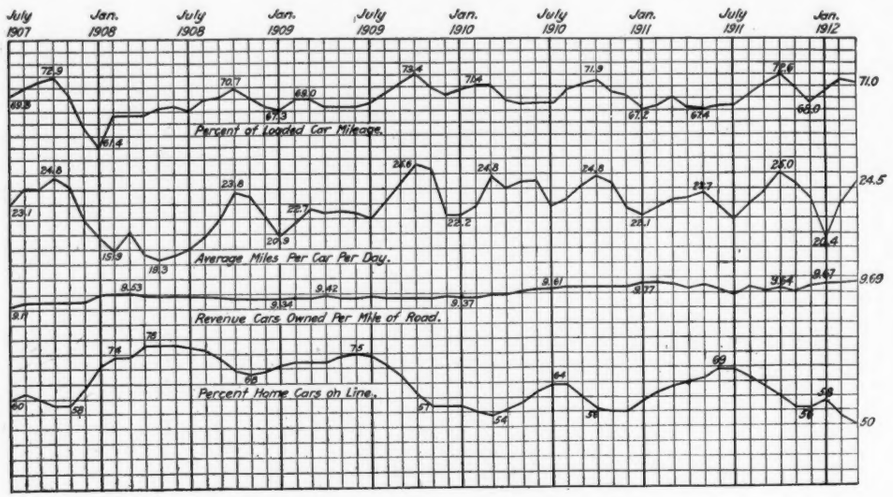
Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 124, covering car balance and performance for March, 1912, says:

The miles per car per day averaged 24.5, including surplus cars, compared with 22.9 in February, and 23.2 in March, 1911. Ton miles per car per day increased from 370 in February to 389 in March, as compared with 332 in March, 1911. The proportion of home cars on line decreased from 54 per

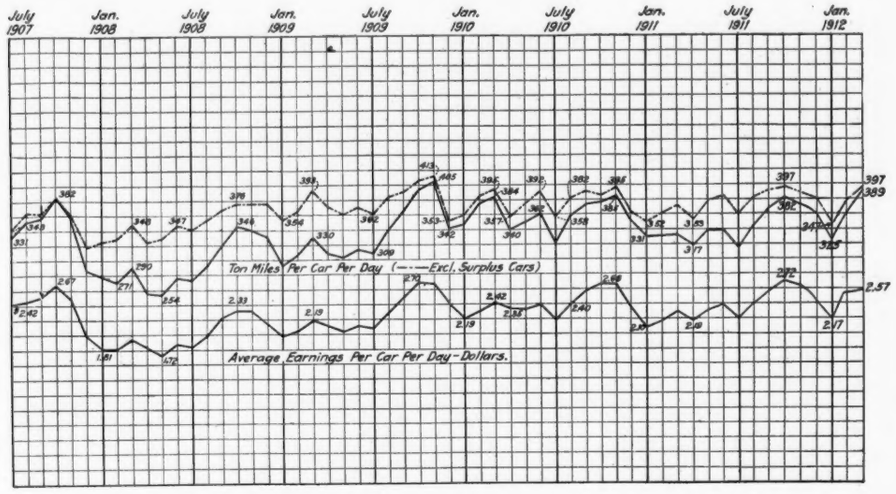
FREIGHT CAR BALANCE AND PERFORMANCE IN MARCH, 1912.

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	84,532	710,538	214,268	189,310	172,774	396,453	17,647	139,256	26,773	144,190	111,989	2,207,730
Average number of system cars on line	41,699	243,342	91,562	93,525	81,649	214,253	5,582	68,235	21,518	65,589	66,685	993,639
Railway-owned cars: Average foreign on line	54,251	199,760	111,361	74,816	81,826	180,480	13,840	63,455	23,761	56,593	60,727	920,870
Total Railway-owned cars on line	104,040	443,102	202,923	168,341	163,475	394,733	19,422	131,690	45,279	122,182	127,412	1,922,599
*Excess	11,418	*55,730	*11,345	*20,969	*9,299	*1,720	1,775	*7,566	18,506	*22,008	15,423	*81,515
Per cent. of cars on line to total owned:												
Home	50	49	43	49	47	54	32	49	80	41	60	50
Foreign	64	39	52	40	48	46	78	41	89	37	54	46
All railways	114	88	95	89	95	100	110	90	169	78	114	96
Private cars on line	4,568	30,548	12,430	5,031	7,998	15,346	1,621	7,538	3,472	11,375	3,714	103,641
Total, all cars on line	108,608	473,650	215,353	173,372	171,473	410,079	21,043	139,228	48,751	133,557	131,126	2,026,240
Per cent. of cars in shop	5.97	5.67	5.16	6.12	7.82	6.37	6.03	8.20	6.04	4.82	5.10	6.11
No. of freight engines owned	1,425	10,640	3,078	3,360	2,782	6,392	525	2,710	713	2,688	2,148	36,461
Average cars on line per freight engine owned	76	61	70	52	62	64	40	51	70	45	61	60
Total freight-car mileage	60,268,804	573,412,062	140,885,539	137,376,625	127,511,783	300,492,933	21,742,427	92,709,287	32,485,790	125,598,290	97,851,668	1,710,335,208
Average miles per car per day	17.9	26.5	21.2	25.6	24.1	23.6	34.4	23.0	20.9	30.2	24.0	24.5
Per cent. loaded mileage	74.5	67.2	72.6	69.2	73.4	68.7	78.9	69.4	64.7	72.1	84.8	71.0
Ton-miles of freight, including company freight	700,240,821	9,479,017,856	2,643,662,008	2,238,806,731	1,868,292,903	3,533,656,161	355,386,978	997,456,159	322,397,846	1,813,217,850	1,690,974,308	25,643,109,621
Average ton-miles, including company freight:												
Per car-mile	11.6	17.0	19.1	16.3	14.8	14.6	16.9	13.8	11.9	14.6	17.3	15.9
Per loaded car-mile	15.6	25.9	26.3	23.6	20.1	20.7	21.3	19.9	18.2	20.3	20.4	22.4
Per car per day	208	450	406	418	356	345	580	318	249	443	416	389
Gross freight earnings	$7,543,692	$54,685,868	$13,757,283	$13,467,323	$12,689,624	$30,030,780	$2,360,848	$10,586,571	$3,214,247	$17,245,009	$10,996,986	$176,578,231
Average daily earnings: Per car owned	$2.60	$2.56	$2.07	$2.29	$2.37	$2.44	$4.32	$2.35	$3.83	$3.43	$3.17	$2.59
Per railway car on line	2.29	2.89	2.19	2.58	2.50	2.45	3.92	2.59	2.26	4.57	2.78	2.71
All cars on line	2.21	2.70	2.06	2.51	2.39	2.36	3.62	2.45	2.10	4.18	2.71	2.57

*Denotes deficiency.



Freight Car Performance, 1907 to 1912.



Freight Car Mileage and Earnings, 1907 to 1912.

cent. in February to 50 per cent. in March, compared with 63 per cent. in March, 1911.

There was a sligth decrease in the percentage of loaded mileage (.9 per cent.) compared with February. This figure for March, 1911, was 68.6 per cent. There was an increase in the average earnings per car per day from $2.49 in February to $2.57 in March, compared with $2.28 in March, 1911.

The accompanying table gives car balance and performance in the month covered by the report, and the two diagrams show car earnings and car mileage and certain car performance figures monthly from July, 1907.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 123, giving a summary of car surpluses and shortages by groups from March 1, 1911, to July 4, 1912, says:

"Total surplus on July 4, 1912, was 70,731 cars; on June 20, 1912, was 73,464 cars, and on July 5, 1911, was 165,508 cars. Compared with the preceding period there is a further decrease in the total surplus of 2,733 cars. The decrease in surplus coal cars is general throughout the country except in groups 1 (New England lines), 6 (Iowa, Illinois, Wisconsin, Minnesota and the Dakotas), 9 (Texas, Louisiana and New Mexico), and 10 (Oregon, Idaho, California, Arizona and Washington). The net decrease in this class of equipment is 6,077 cars. There is a net increase in box car surplus of 3,056 cars. This is most apparent in groups 4 (the Virginias and Carolinas) and 6 (as above). There is a slight decrease in surplus flat cars and an increase in surplus miscellaneous cars, general throughout the country.

"Total shortage on July 4, 1912, was 6,707 cars; on June 20, 1912, was 5,746 cars, and on July 5, 1911, was 1,887 cars. Compared with the preceding period there is a further increase in the total shortage of 961 cars, of which 292 is in box, 301 in flat, 586 in coal. The increase in box cars is most apparent in groups 1 (as above), 7 (Montana, Wyoming and Nebraska), 9 (as above) and 11 (Canadian lines). The increase in coal car shortage is general throughout the country, except in groups 3 (Ohio, Indiana, Michigan and western Pennsylvania) 9 and 10 (as above). The increase in flat car shortage is most apparent in groups 3, 4 and 6 (as above). There is a slight decrease in miscellaneous cars general throughout the country. Compared with the same date of 1911 there is a decrease in the total surplus of 94,777 cars, of which 23,213 is in box, 3,079 in flat, 57,121 in coal and 11,364 in miscellaneous cars. There is an increase in the total shortage of 4,820 cars, of which 2,582 cars is in box, 1,553 in flat, 969 in coal and a decrease of 284 miscellaneous cars."

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report, and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1912.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended until October 29 certain new regulations affecting the transportation of baggage, contained in tariffs filed by the Baltimore, Chesapeake & Atlantic, and other roads similar to those filed by carriers throughout the United States to become effective July 1, which are under suspension.

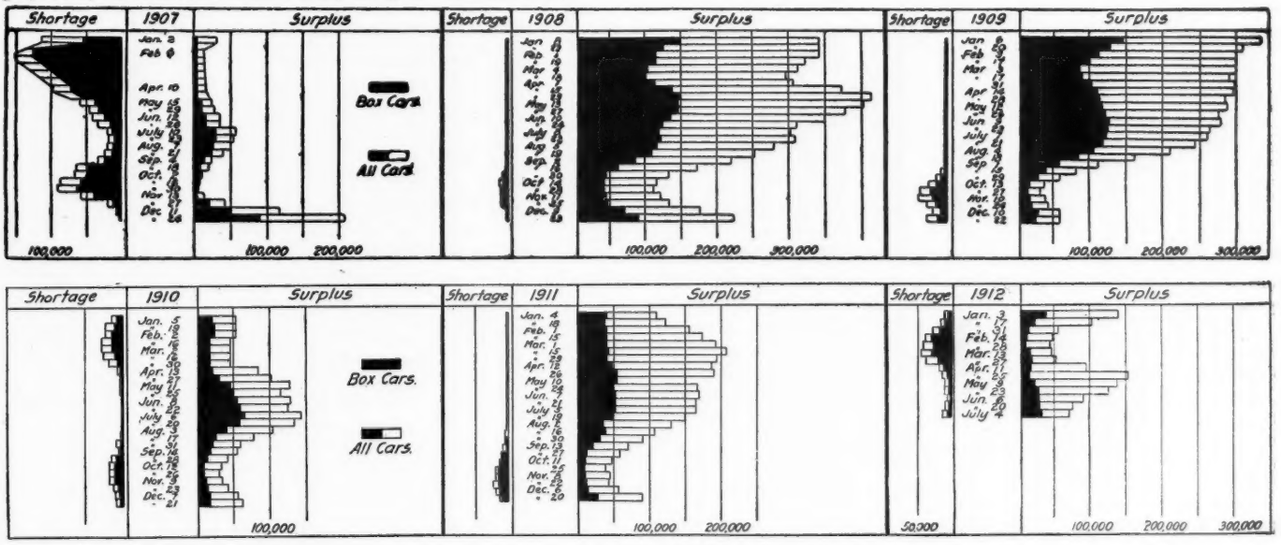
The commission has suspended until November 12, certain tariffs, which advance the rates for the transportation of horses and mules between Chicago, St. Louis, Mo., and other points and stations in South Dakota, Nebraska, Kansas, Oklahoma, Colorado and Wyoming. The proposed advances range in amount from $1 to $16.50 per car.

Examiner George P. Boyle held a three-day hearing at Chicago last week on a complaint of the Chicago Board of Trade against the rate of 10 cents per 100 lbs. on wheat from Minneapolis, Minn., to Chicago, alleging discrimination in favor of the

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—July 4, 1912	7	10	131	126	116	383	543	200	317	1	1,061
" 2.— " 4, 1912	25	1,889	90	1,822	698	4,499	0	5	437	7	449
" 3.— " 4, 1912	26	3,580	107	3,067	2,258	9,012	310	330	0	50	690
" 4.— " 4, 1912	9	1,022	2	378	1,247	2,649	136	567	0	0	703
" 5.— " 4, 1912	19	1,108	6	1,319	1,460	3,893	31	108	25	1	165
" 6.— " 4, 1912	25	10,509	299	1,652	5,207	17,667	25	94	232	14	365
" 7.— " 4, 1912	4	60	84	2	516	662	102	0	10	0	112
" 8.— " 4, 1912	16	3,071	319	1,381	3,268	8,039	0	100	15	0	115
" 9.— " 4, 1912	12	1,142	160	430	1,102	2,834	100	0	0	0	100
" 10.— " 4, 1912	22	7,255	1,829	3,065	8,486	20,635	0	28	0	0	28
" 11.— " 4, 1912	6	16	11	0	431	458	2,214	424	0	281	2,919
Total	171	29,662	3,038	13,242	24,789	70,731	3,461	1,856	1,036	354	6,707

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1912.

Minneapolis millers who have a 7½-cent proportional with milling-in-transit privilege at Minneapolis.

Examiner Burchmore held a hearing at Denver, Col., on July 12 on a complaint filed by the Denver Chamber of Commerce asking a reduction in class and commodity rates from territory east of the Mississippi river to Denver and Salt Lake City, Utah.

Rates on Cotton Seed Reduced.

East Saint Louis Cotton Oil Company v. St. Louis & San Francisco et al. Opinion by Commissioner Clements:

The commission found that the practice of the defendants of charging higher rates on cotton seed than on cotton seed oil from various stations in Arkansas, Oklahoma, Tennessee and Mississippi to East St. Louis, Ill., was in violation of the law, and ordered that in future rates on cotton seed should not exceed the rates on cotton seed oil. (24 I. C. C., 588.)

Reparation Awarded.

Bancroft-Whitney Co. v. Cincinnati, New Orleans & Texas Pacific et al. Opinion by the commission:

The commission found that the first class rate of $3 per 100 lbs. on shipments of electrotype plates from Cincinnati, Ohio, to San Francisco, Cal., was unreasonable, to the extent that it exceeded the second class rate of $2.60 per 100 lbs. (24 I. C. C., 557.)

F. B. Alexander v. Southern Pacific et al. Opinion by the commission:

The complainant shipped a crated automobile from El Paso, Tex., to Los Angeles, Cal. The defendant decided that the crate did not comply with the requirements of the tariff and charged the rate applicable to uncrated automobiles. The commission found that the definition of crates in the tariff was ambiguous, and that the rate on crated automobiles should have been applied. (24 I. C. C., 306.)

National Refining Co. v. Missouri Pacific. Opinion by the commission:

The commission found that the present rate of 33.1 cents per 100 lbs. for the transportation of petroleum and its products in carloads from Coffeyville, Kan., to Hastings, Neb., was not unreasonable, but that the rate of 18.4 cents per 100 lbs. for the transportation of petroleum and its products in carloads from Coffeyville to Sedalia, Mo., was unreasonable to the extent that it exceeds 17 cents. (24 I. C. C., 315.)

Herman Loeb v. Texas & Pacific. Opion by the commission:

The complainant was charged a rate of 72 cents per 100 lbs. on a shipment of cotton-compress machinery in carloads from New Orleans, La., to Marshall, Tex. He contends that this rate is unreasonable, in that it exceeds the aggregate of intermediate rates from New Orleans to Shreveport and thence to destinatian. This aggregate of intermediate rates was 58 cents per 100 lbs. The commission found that the rate of 72 cents per 100 lbs. was unreasonable, to the extent that it exceeded 40 cents. (24 I. C. C., 304.)

St. Louis Blast Furnace Co. v. Virginian Railway et al. Opinion by Commissioner Meyer:

The commission found that the rates charged the complainant on shipments of coke from Page, W. Va., Ansted and Glassport, Pa., to Carondelet, Mo., were neither unreasonable nor unduly discriminatory, nor did they subject the complainant to undue prejudice or disadvantage; but the rates charged on shipments of coke from Page to Carondelet, which moved via New Albany, Ind., were greater than the rates specified in the tariffs in effect at that time, because, in the absence of a joint rate between those points, the rates applied exceeded the combination of intermediate rates which existed at the same time and which should have been applied to the shipments in question. (24 I. C. C., 361.)

Jackson & Perkins Co. v. Southern Pacific et al. Opinion by the commission:

The complainant was charged at the rate of $70 per car for refrigeration on shipments of nursery stock from points in California to Newark, N. J. Prior to 1910 the refrigeration charges for such shipments did not exceed $22 per car. Complainant showed that though it had specifically ordered the carrier to only ice the car at the point of origin, the carrier had reiced the car at other points along the route. The complainant insists that this additional icing is actually detrimental to the shipments. The defendants showed that the amount of ice required for one icing at the point of origin was about 5½ tons, and that the cost was about $3 a ton. The commission found that the rate of $70 per car on such shipments was unreasonable and that a rate of $31.50, based on $16.50 for ice, $5 for repairs to the ice bunkers and $10 for hauling the ice and putting it into the car, should hereafter apply. (24 I. C. C., 323.)

Complaint Dismissed.

Anadarko Cotton Oil Co. et al. v. Atchison, Topeka & Santa Fe et al. Opinion by the commission:

This hearing is supplemental to 20 I. C. C., 43, in which rates on the products of cotton seed, including oil, hulls, cake, meal and lint, from producing points in Oklahoma to various markets were attacked as unreasonable. The commission found that after consideration of both the original and supplemental evidence, these rates were not shown to be unreasonable. (24 I. C. C., 327.)

Red "C" Oil Manufacturing Co. v. Alabama & Vicksburg et al. Opinion by Commissioner Clements:

The southern classification requires shipments of benzine, gasolene and naphtha to be made in metal drums and metal barrels. The complainant contends that this rule is unreasonable and prejudicial, and says that no such rule is in effect in other parts of the country. The commission found that it would be a step backward to order the defendants to strike out this rule, as its purpose was to promote safety, and as it would not be long before this rule would be in force throughout the country. (24 I. C. C., 542.)

Globe Milling Co. v. the Chicago, Milwaukee & St. Paul. Opinion by commission:

Watertown, Wis., is now on a parity with Minneapolis, Minn., in the milling of rye when the product moves to eastern destinations. The complainants contend that reparation should be made on shipments made before the present rate situation was in effect. The commission found that the facts did not show that the charges exacted for the milling-in-transit privilege was excessive. The commission also found that the fact that a carrier has by certain rate adjustment as to one commodity enabled a manufacturer to overcome the natural disadvantages of his location, is not in itself a ground upon which the commission is justified in establishing a similar adjustment as to another commodity. (24 I. C. C., 595.)

C. W. Hull Co. v. Southern Railway et al. Opinion by the commission:

On through shipments of washed No. 1 egg coal the complainant was charged on the net weight of the shipment minus 1 per cent. as an allowance for moisture by three roads. The Chicago & North Western, however, which formed part of the haul, did not make any deductions from the net weight for moisture. The tariff of the Chicago & North Western states that on receiving shipments from connecting lines the weights at which the shipments were carried by those lines would be accepted. The complainant contends that the North Western is bound to make the deduction for moisture if it accepts the weights at which the shipments were carried by the connecting lines. The commission found, however, that the roads granting the allowance for moisture stated that those allowances were deductions from the actual net weights, and therefore they would have to cite the actual net weights to the Chicago & North Western rather than the weights after the deductions had been made. (24 I. C. C., 302.)

Memphis Freight Bureau v. St. Louis, Iron Mountain & Southern. Opinion by the commission:

Prior to August 15, 1907, transit privileges were granted on shipments of logs from points in Arkansas to other points in that state when for reshipment to Memphis, Tenn. On August 15, 1907, the through rates were abolished on such shipments and local rates were charged. On May 21, 1908, the through rate was re-established. Complainant seeks repa-

ration on shipments made during the period between August 15, 1907, and May 21, 1908, on the basis of the rate previously in force and afterwards re-established. The commission found that the tariff naming the rates in effect during this period in no way referred to the manufacturing and reshipping tariffs and did not so connect the inbound and outbound movement as to constitute continuous carriage from the points of origin of the materials to the points of destination of the products. The complainant contends that the delivery of an inbound shipment at a transit point is but one step of a progressive movement and that the status of such a shipment remains unchanged as to the period of limitation, even though at the time of delivery there was no authority in the tariff, under which this shipment moved, to in any way alter or modify the rate named because of fabrication of the shipment. The commission found that in this case there were no circumstances under which the transportation into and out of the transit point might be characterized as continuous. (24 I. C. C., 547.)

Rates on Bituminous Coal Reduced.

Grenada Oil Mill v. Illinois Central. Opinion by the commission:

The commission found that the rate of $1.80 per net ton for the transportation of bituminous coal from Herrin, Ill., and Wheatcroft and Sturgis, Ky., to Grenada, Miss., was unreasonable, to the extent that it exceeds $1.60 per net ton. (24 I. C. C., 318.)

Rates on Rough Iron Castings Reduced.

Central California Traction Co. v. Chicago, Milwaukee & St. Paul et al. Opinion by the commission:

At the time the shipments of rough iron castings in sacks moved the western classification provided for fourth class rating on castings in less than carloads in bags, boxes or casks. The fourth class rate from Beaver Dam, Wis., to Stockton, Cal., the points between which the shipments moved, was $1.90 per 100 lbs. At the same time, however, the defendants' tariffs named a commodity rate of $1.60 on castings, n. o. s., in boxes, casks or crates. A rule of this tariff provided that iron castings in bags or bundles should take a rate 50 per cent. higher than if they were in boxes. Under the application of this rule the complainant was charged $2.40 per 100 lbs. The commission decided that where an article is covered by both a commodity and a class rate the commodity rate should apply, as it was the more specific of the two, but that in this case the commodity rate was unreasonable, in that it exceeded $1.90 per 100 lbs. Reparation was awarded. (24 I. C. C., 550.)

Mixed Carload Rates on Grain and Grain Products.

Southwestern Millers' League v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Harlan:

Under the rule formerly in effect on mixed carload shipments of grain or grain products the balance of the through rate or the outbound proportional rate was applied on the actual weight of the transit commodity in the car, and the flat carload rate from the milling point was assessed on the actual weight of the non-transit commodity in the car. When the actual weight of the entire shipment was less than the minimum carload weight, the billed weight of the transit portion of the shipment was increased so that the sum of the billed weights of the transit and non-transit articles would equal the carload minimum weight. The defendants have abolished this rule and have established a new one.

The present rule requires the transit portion of the shipment to be charged at the balance of the through rate or at the reshipping rate based on the carload minimum weight. Any non-transit grain or grain products in the car must be treated as a separate shipment from the milling point taking the flat local less than carload rate on the basis of its actual weight.

The complainants allege that this rule is unreasonable and discriminatory, in that it puts the small millers at interior points at a substantial disadvantage. Much of the grain used by them is of local origin or is non-transit because it has come in over a road other than the one that has the outbound haul. The supply of transit grain is therefore limited. The millers at large milling points and primary markets make no objection to the rule because it has no practical application to their operations, as substantially all of their grain comes in on transit rates. In this way they escape the payment of local rates and are able to ship the entire contents of their cars at the balance of a through rate. The defendants claim that the former rule was withdrawn and the present one established in order to conform their practices more closely to the views of the commission in regard to transit privileges. The complainants seek to have the former rule restored and contend that it did not conflict with the law or with the rulings of the commission. They also point out that the official classification permits consolidation in carloads of different commodities under a rule that applies to the entire shipment the highest carload rate and minimum weight on any article in the mixture. The commission found, however, that the former rule did not purport to establish a carload rate on a mixed carload shipment from a transit point, but to apply from that point the balance of a carload rate from a point beyond to a less than carload shipment of a transit commodity from the transit point and permit the shipment to make good the shortage in the minimum weight by putting into the car at the transit point the required weight of some non-transit commodity. The result of the operation of the rule was not only to give to a less than carload quantity of the transit commodity the benefit of the balance of a through carload rate, but to give a carload rate to a non-transit commodity, although moving in less than carload quantity from the transit point. This conflicts with some of the findings in regard to transit practices, but the present ruling is free from that objection. The commission found that there is no objection to the application of carload rates on mixed carload shipments of transit and non-transit grain and grain products, and will permit the use of the proportional carload rate or the balance of the through rate on the transit portion of such a shipment and a flat carload rate from the transit point on the non-transit portion. The total charges are to be based on the highest carload minimum applicable on any commodity in the car. It should also be provided that the carload rate should not apply to that portion of the shipment, whether transit or non-transit, the actual or billed weight of which is less than 10,000 lbs., and that the traffic should be surrounded with all the safeguards required by the transit rulings of the commission. No order was made nor was any reparation awarded. (24 I. C. C., 552.)

Rates on Watermelons Not Changed.

J. H. Bahrenburg, Bro. & Co. et al. v. Atlantic Coast Line et al. Opinion by Commissioner Prouty:

The commission found that though the fact that the rate on watermelons was lower from the southeastern territory to the middle west than to the Atlantic seaboard, tends to show that the latter rate might well be reduced, examination had shown that it was not sufficient to condemn as unreasonable rates that are reasonable when compared with the rates fixed by the commission in other cases. The commission did not undertake to determine the exact relation which should exist between the rates on watermelons and the rates on cantaloupes, but found that the present rate on cataloupes had not been shown to be unlawful. The complainant alleged that rates to different points in trunk line territory had not been properly adjusted with reference to other territory. The commission found that this allegation was not established, but reserved the right upon a more specific complaint and a fuller record to further examine that question. The complainant also contended that the defendants should be ordered to resume delivery in New York City instead of Jersey City, as is now the practice, or in default, that the rate should be reduced by an amount which would fairly equal the saving to the railway by the change. The commission found that the defendants were amply justified in changing the delivery to Jersey City, on account of lack of facilities at New York. (24 I. C. C., 560.)

Class Rates from Galveston Reduced.

Southwestern shippers' Traffic Association v. Atchison, Topeka & Santa Fe et al. Opinion by Chairman Prouty:

The commission found that the present class rates from Galveston, Tex., to Wichita, Kan., and Oklahoma City, Okla., were

unreasonable, and prescribed reasonable rates for the future. An attempt to name proportional rates on this traffic, as requested by the complainants, would not be wise under the circumstances. The complainant attacks the reasonableness of the through rate from the Atlantic seaboard to points in Texas, but that part of the case was not urged in the trial, and was, therefore, not considered. The monopolistic conditions which have existed in the water traffic between the Atlantic seaboard and Galveston have resulted in excessive charges, but to what extent was impossible to determine. The present class rates from the Atlantic seaboard territory to Wichita, Denver and Oklahoma City were not found to have been unreasonable. (24 I. C. C., 570.)

Morristown, Tenn., Discriminated Against.

Board of Trade of Morristown, Tenn., et al. v. Atlantic Coast Line et al. Opinion by Commisisoner Meyer:

The commission found that Morristown, Tenn., and other points between Bristol, Tenn., and Knoxville on the direct line of the Southern Railway, are entitled to rates from New York City and related points not higher than the rates from those points to Knoxville. The commission also found that the commodity rate on glassware, n. o. s. from Pittsburgh, Pa., and Wheeling, W. Va., to Morristown, should not exceed the combination on Bristol. The reasonableness of other rates was also attacked, but the commission found that the evidence was not conclusive. No reparation was awarded. (24 I. C. C., 372.)

Rates on Lime-Sulphur Solution Reduced.

Hardie Manufacturing Company v. Oregon Railroad and Navigation Company et al. Opinion by the commission:

The commission found that the rate of 85 cents per 100 lbs., minimum 40,000 lbs., charged for transportation of a carload of lime-sulphur solution from Pullman Junction, Ill., to Portland, Ore., was unreasonable to the extent that it exceeds 65 cents per 100 lbs., minimum 30,000 lbs. As there was some doubt about the actual weight of the shipment, the order for reparation was postponed. (24 I. C. C., 545.)

COURT NEWS.

The Grand Rapids & Indiana was fined $14,000 and the Nichols & Cox Lumber Company $3,000 in the United States district court at Grand Rapids, Mich., on July 9 for rebating. The court assessed the minimum fine on each count.

The Wisconsin upper berth law was declared invalid in a decision by Circuit Judge Stevens at Madison, Wis., on July 10. The law provided that whenever a person occupied a lower berth in a sleeping car and the upper berth of the same section was not engaged the upper must remain closed. In a test case against the Chicago, Milwaukee & St. Paul the court held that the law takes the defendant's property without just compensation.

The Supreme Court of New Jersey has sustained the order of the Public Utilities commission of the state requiring railways to sell season tickets to Jersey City, Hoboken and Camden. Hitherto the railways terminating in these cities have sold season tickets only to New York or Philadelphia, so that a passenger desiring to terminate his journey at the New Jersey town and not to cross the ferry nevertheless had to pay the same price as was paid by passengers using the ferry.

The Supreme Court of Illinois has decided that the law of that state prohibiting the drinking of intoxicants on certain cars of passenger trains is constitutional. The case was carried to the high court by Mrs. Amabelle Tarantina of Ashley, Ill. Mrs. Tarantina sued for damages in the county court against the Louisville & Nashville for an alleged sickness and nervous breakdown caused by a tussle with a conductor who attempted to eject her because she took a draught of intoxicating liquor while on the train. She alleged that she was sick and used the stimulant on a doctor's prescription. The county court held that the law was constitutional and the conductor was vested with the authority by law to eject and have placed under arrest any passenger who partakes of an intoxicant while riding in any other coach than the buffet car; and this decision is now sustained.

Railway Officers.

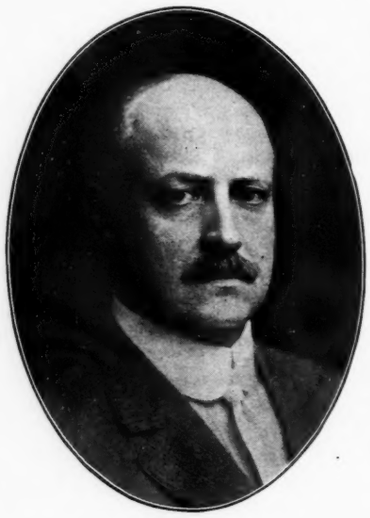
ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

The office and title of assistant auditor of the Texas & Pacific has been abolished.

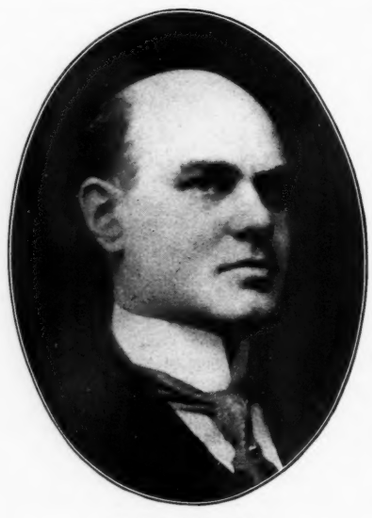
T. A. Duff has been appointed auditor of the Southern Pacific of Mexico, with office at Tucson, Ariz., succeeding G. E. Bissonnet, promoted.

John Graham Drew, whose election as vice-president in charge of accounts of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with office at St. Louis, Mo., has been announced in these columns, was born at Hammondsport, N. Y., on February 12, 1864. In January, 1881, he began railway work at Seneca, Kan., as a station clerk on the St. Joseph & Western, now the St. Joseph & Grand Island, and he was with that railway for over 18 years, having been consecutively telegraph operator, agent, chief clerk to superintendent, chief clerk to general manager, general bookkeeper, chief clerk to auditor and auditor. On June 1, 1899, Mr. Drew was appointed assistant comptroller of the Great Northern at St. Paul, Minn., and two and one-half years later was promoted to comptroller, which office he held until June, 1911. He then left the Great Northern to become general auditor of the Missouri Pacific-Iron Mountain System, from which position he has now been advanced to vice-president in charge of accounts.



J. G. Drew.

J. G. Livingood, who has been appointed general auditor of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with offices at St. Louis, Mo., as has been announced in these columns, was born at Rockville, Ind., on October 28, 1873. He began railway work in April, 1899, as a freight handler on the Milwaukee & Northern, now the Chicago, Milwaukee & St. Paul, at Marinette, Wis., and was later consecutively yard clerk and freight and ticket clerk with the Chicago, Milwaukee & St. Paul at Minneapolis, Minn.; in freight train service on the Minneapolis, St. Paul & Sault Ste. Marie, and with the Great Northern, first as waybill clerk at Minneapolis and later as bill clerk, chief clerk and cashier at Superior, Wis. He was appointed auditor of the Erie & Wyoming Valley at Dunmore, Pa., in 1900, and in March, 1901, when that road was taken over by the Erie, he was made chief clerk in the disbursement department of the Erie, was subsequently appointed auditor of disbursements, and



J. G. Livingood.

in 1911 was promoted to auditor. On July 17, 1911, he left the Erie to become auditor of disbursements of the Missouri Pacific-Iron Mountain system, from which office he has just been promoted to general auditor.

F. B. Johnson has been appointed auditor of disbursements of the Missouri Pacific and the St. Louis Iron Mountain & Southern, with office at St. Louis, Mo., succeeding J. G. Livengood, promoted.

G. E. Bissonnet, auditor and car accountant of the Southern Pacific of Mexico and the Arizona Eastern, at Tucson, Ariz., has been appointed assistant to the comptroller of the Harriman lines, with headquarters at New York.

J. A. Strubel, assistant to the receivers of the Detroit, Toledo & Ironton at Detroit, Mich., has been appointed assistant to the receiver and purchasing agent, and E. F. Drake has been appointed general counsel for the receiver, both with office at Detroit.

George R. Drysdale has been appointed auditor and treasurer of the Arizona & New Mexico, with office at Clifton, Ariz., succeeding to part of the duties of A. T. Thomson, who was treasurer, traffic manager and general superintendent, resigned to accept service with another company.

E. E. Calvin, vice-president and general manager of the Southern Pacific at San Francisco, Cal., has been elected vice-president in general charge of operation and construction. C. J. Hillis has been appointed assistant to the president, and H. A. Jones, freight traffic manager, has been appointed assistant treasurer, succeeding C. H. Redington, retired; all with office at San Francisco.

Operating Officers.

F. P. Clark has been appointed assistant superintendent of the Chicago, Burlington & Quincy, with headquarters at Chicago.

W. H. Averell, assistant to general manager of the Baltimore & Ohio, at Baltimore, Md., has been appointed assistant general superintendent with headquarters at Pittsburgh, Pa.

L. R. Clausen, superintendent of the Chicago & Milwaukee devision of the Chicago, Milwaukee & St. Paul, with office at Chicago, has resigned, effective July 24, to engage in other business.

W. R. Scott, assistant general manager of the Southern Pacific, at San Francisco, Cal., has been appointed general manager, in direct charge of operation and maintenance, with office at San Francisco.

Isaac A. Canning, chief clerk to the superintendent of dining cars of the Erie Railroad, has been appointed superintendent of dining cars, with headquarters at Jersey City, N. J., succeeeding T. C. Clifford, deceased.

G. W. Atmore, trainmaster of the Atchison, Topeka & Santa Fe at Argentine, Kan., has been appointed assistant superintendent of the Northern Pacific at Duluth, Minn., and superintendent of the Duluth Union Depot & Transfer Company.

A. T. Thompson, general superintendent and traffic manager of the Arizona & New Mexico, with office at Clifton, Ariz., having resigned, those offices have been abolished, and all matters pertaining to the operating department should be addressed to P. Reisinger, superintendent at Clifton.

W. P. Danforth, superintendent of the Missouri, Kansas & Texas of Texas at Trinity, Tex., has been appointed superintendent, with office at Greenville, Tex., succeeding C. M. Bryant, assigned to other duties. As has been announced in these columns, A. N. Williams succeeds Mr. Danforth.

W. G. Koch, superintendent of the Southwestern division of the St. Louis & San Francisco at Sapulpa, Okla., has been appointed superintendent of the Central division at Fort Smith, Ark., and E. L. Magers, assistant superintendent of the Northern division at Fort Scott, Kan., succeeds Mr. Koch. J. F. Liston, assistant superintendent at Birmingham, Ala., has been transferred to Fort Scott, in place of Mr. Magers, and F. G. Faulkner, assistant superintendent of the Southwestern division at Sapulpa, succeeds Mr. Liston. A. S. Johnson succeeds Mr. Faulkner.

J. S. McAdam, chief train despatcher of the Ottawa division of the Grand Trunk, at Ottawa, Ont., has been appointed trainmaster of the thirty-first and thirty-second districts, with headquarters at Ottawa, succeeding J. P. Kirkpatrick, resigned. H. C. White succeeds Mr. McAdam. E. S. Cooper, acting chief despatcher of the Fourth and Fifth districts, at Montreal, Que., has been appointed acting trainmaster of the First and Second districts, with headquarters at Island Pond, Vt., succeeding J. W. Farrell, granted leave of absence. O. Masse, acting night chief despatcher of the Fourth and Fifth districts, at Montreal, succeeds Mr. Cooper, and F. B. Nixon succeeds Mr. Masse.

George Hannauer, who has been appointed general manager of the Indiana Harbor Belt Railroad, with office at Gibson, Ind., as has been announced in these columns, was born December 19, 1872, at St. Louis, Mo., and began railway work on September 24, 1890, with the Terminal Railroad Association of St. Louis, remaining with that road until March, 1903. He was then for four years superintendent of the Wiggins Ferry Company of St. Louis, and on April 8, 1907, went with the Indiana Harbor Belt as superintendent. On January 1, 1911, he was made general superintendent, from which office he was promoted to general manager, as noted above, on July 1, 1912.

Charles F. Hopkins, who has been appointed superintendent of the St. Louis & San Francisco, with office at Francis, Okla., as has been announced in these columns, was born April 30, 1882, at Hearne, Tex. He finished his high school education in June, 1897, and in September of that year began railway work as a messenger boy on the Gulf, Colorado & Santa Fe at Temple, Tex. He was then consecutively until December, 1906, when he left the Santa Fe, roadmaster's clerk, superintendent's clerk, trainmaster's clerk, bridge and building clerk, accountant and chief clerk to superintendent. In December, 1906, he went with the St. Louis & San Francisco, with which road he has been ever since, first as chief clerk to the superintendent at Memphis, Tenn., then chief clerk to the general superintendent, and later assistant superintendent of the Northern and Southwestern divisions. At the time of his recent promotion to superintendent at Francis he was chief clerk to the general manager at Springfield, Mo.

Austin E. Wallace, whose appointment as superintendent of the Minnesota division of the Chicago, Rock Island & Pacific, with office at Cedar Rapids, Iowa, has been announced in these columns, was born March 2, 1879, at Nashua, N. H. He graduated from Harvard University, receiving the A.B. degree, in 1902, and in October of that year began railway work with the Great Northern as a clerk at Larimore, N. D. For a year from December, 1902, he was timekeeper. From January, 1904, to November, 1906, Mr. Wallace was with the Chicago, Rock Island & Pacific at Cedar Rapids, Iowa, where he was consecutively yard clerk, timekeeper and chief clerk to the superintendent. He went with the Chicago, Burlington & Quincy in January, 1907, from which time until July 1, 1912, he was consecutively train and station inspector, and later assistant extra gang foreman at Alliance, Neb.; assistant roadmaster and then trainmaster at Sheridan, Wyo., and assistant superintendent, with office at St. Paul, Minn., which position he resigned on July 1 to return to the Rock Island Lines as superintendent at Cedar Rapids.

Traffic Officers.

William Blonder has been appointed traveling passenger and immigration agent of the Great Northern, with office at Chicago.

J. A. Bucknell, agent of the Grand Trunk at Jackson, Mich., has been appointed traveling freight agent, with office at Chicago, succeeding W. H. Burke, promoted.

H. M. Wade, agent mail traffic of the Erie Railroad at New York, has been appointed also general baggage agent, with headquarters at New York, succeeding T. C. Clifford, deceased.

H. B. Sperry, general freight and passenger agent of the Texas Central at Waco, Tex., has been appointed assistant general freight agent of the Missouri, Kansas & Texas, of Texas; W. E. Seifer, agent of the Missouri, Kansas & Texas at Waco, succeeds Mr. Sperry.

R. K. Minson has been appointed general freight and passenger agent of the Arizona & New Mexico, with office at Clifton, Ariz., succeeding to the duties of A. T. Thomson, traffic manager, resigned to accept service with another com-

pany. All matters pertaining to freight and passenger traffic, also loss, damage and overcharge claims, should be addressed to Mr. Minson.

H. F. Bostwick, traveling passenger agent of the New York Central Lines at Oklahoma City, Okla., has been appointed traveling passenger agent of the Lake Shore & Michigan Southern, the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis, with office at Kansas City, Mo., succeeding C. W. Green, resigned, to engage in other business; C. L. Holloway succeeds Mr. Bostwick.

G. W. Roberts has been appointed district freight and passenger agent of the Oregon-Washington Railroad & Navigation Company, with office at Astoria, Ore., succeeding C. F. Overbaugh, resigned to engage in other work. J. H. O'Neill, traveling passenger agent at Portland, Ore., has been appointed district passenger agent of that company and the Southern Pacific, with office at Seattle, Wash., succeeding E. E. Ellis, resigned.

J. L. McPherson, civil and mining engineer, has been placed in charge of the industrial department of the White Pass & Yukon Route, comprising the Pacific & Arctic Railway & Navigation Company, the British Columbia Yukon Railway, the British Yukon Railway and the British Yukon Navigation Company, with office at Skaguay, Alaska. The purpose of this department is to investigate the mining resources of Alaska and the Yukon territory contiguous to the transportation property and to aid in its development.

L. A. Burritt has been appointed agent of the Interstate Despatch, with office at Chicago, succeeding F. J. Bouchard, assigned to other duties. George E. Roemer, agent at Kansas City, Mo., has been appointed traveling freight agent, with office at Chicago, and J. P. Hayes succeeds Mr. Roemer. C. R. Dassell has been appointed traveling freight agent, with office at Cincinnati, Ohio, succeeding H. P. Crume, resigned, and F. H. Montgomery has been appointed traveling freight agent, with office at Cleveland, Ohio.

G. W. Luce, assistant to the vice-president in charge of traffic of the Southern Pacific at San Francisco, Cal., has been appointed freight traffic manager, with office at San Francisco, succeeding H. A. Jones, appointed assistant treasurer, and Mr. Luce's former office has been abolished. Thomas A. Graham, general freight agent at San Francisco, has been appointed assistant freight traffic manager, and A. H. Rising, assistant general freight agent at San Francisco, succeeds Mr. Graham. W. F. Taylor succeeds Mr. Rising.

Engineering and Rolling Stock Officers.

M. J. Brew, trainmaster of the Chicago, Rock Island & Pacific at Chicago, has been appointed division engineer, with office at Chicago.

A. H. Babcock, electrical engineer of the Southern Pacific at San Francisco, Cal., has been appointed consulting electrical engineer.

Robert H. Ford has been appointed engineer of track elevation of the Rock Island Lines, with offices at Chicago, succeeding C. W. Petersen, resigned.

J. F. McDonough, master mechanic of the Atchison, Topeka & Santa Fe at Newton, Kan., has been appointed master mechanic, with office at Shopton, Fort Madison, Iowa, succeeding J. R. Sexton, promoted. I. Wellman, road foreman of engines at Argentina, Kan., succeeds Mr. McDonough. Effective June 8.

J. H. Johnston, master of bridges and buildings, Ottawa division of the Grand Trunk, at Ottawa, Ont., has been appointed master of bridges and buildings of the Eastern division, with headquarters at Montreal, Que., succeeding A. Findley, retired under the pension rules of the company after 46 years' service. J. Chisholm succeeds Mr. Johnston, with headquarters at Ottawa.

V. R. Walling, superintendent of the Cananea Consolidated Copper Company's railway at Cananea, Sonora, Mex., has been appointed principal assistant engineer of the Chicago & Western Indiana and the Belt Railway of Chicago, with office at Chicago, succeeding M. K. Trumbull, resigned to become manager of the treating plants of the National Lumber & Creosoting Company, at Houston, Tex.

E. F. Stroeh, master mechanic, Colorado division of the Missouri Pacific, at Hoisington, Kan., has been appointed master mechanic of the Kansas City Terminal division, with office at Kansas City, Mo., succeeding W. C. Smith, promoted. W. G. Seibert, master mechanic Omaha division at Falls City, Neb., succeeds Mr. Stroeth, with office at Hoisington, and J. D. Young, general foreman at Atchison, Kan., succeeds Mr. Seibert.

William O. Houston, who has been appointed division engineer of the Michigan Central, with office at St. Thomas, Ont., as has been announced in these columns, was born October 30, 1878, at Burlington, Kan. He was educated at the University of Michigan, and in the summer of 1901 began railway work as rodman on the Michigan Central. From 1902 he was consecutively topographer and draftsman on location on an electric road, assistant engineer on the Ann Arbor Railroad, instrument man on the Michigan Central, and from 1905 to 1909 with the New Orleans Great Northern, first as resident engineer, then division engineer and later chief engineer. During 1909 he was with the Michigan Central as assistant engineer, and the next year was engineer in charge of construction of the Nevada Central. In 1911 he returned to the Michigan Central as assistant engineer, was made construction engineer early in 1912, and on June 15 was appointed division engineer, with office at St. Thomas, Ont.

Purchasing Officers.

J. A. Strubel, assistant to the receivers of the Detroit, Toledo & Ironton at Detroit, Mich., has been appointed assistant to the receiver and purchasing agent, with office at Detroit.

Berton Allen Aikens, whose appointment as purchasing agent of the Michigan Central, with office at Detroit, Mich., has been announced in these columns, was born August 25, 1869, at Hartford, Vt., and he received a public school education. He began railway work on April 1, 1889, with the Central Vermont Railroad. On April 1, 1899, he became a clerk in the office of the purchasing agent of the Rutland Railroad, was subsequently chief clerk in that office, then assistant storekeeper, and on February 1, 1905, was promoted to purchasing agent, which office he resigned on July 1 to become purchasing agent of the Michigan Central, and, effective July 11, to become also general tie agent of that road, the Lake Shore & Michigan Southern; the Lake Erie & Western; the Lake Erie, Alliance & Wheeling; the Cleveland, Cincinnati, Chicago & St. Louis; the Peoria & Eastern, the Cincinnati Northern; the Toledo & Ohio Central; the Zanesville & Western, and the Chicago, Indiana & Southern.

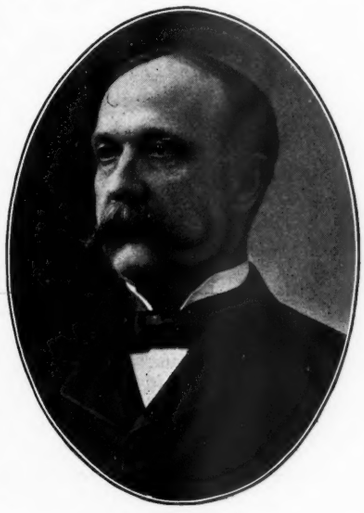
B. A. Aikens.

OBITUARY.

Stewart S. Neff, who was superintendent of the Boston Elevated Railway in its early years, died on July 12, in Chelsea, near Atlantic City, N. J. Mr. Neff was born on October 24, 1858, at Cincinnati, Ohio, and graduated from Rensselaer Polytechnic Institute at Troy, N. Y. He began railway work in 1881 as transitman on the Pennsylvania. He was in the roadway department of that road for about six years, and then for four years was superintendent of the Cornwall Railroad. From March, 1891, to June, 1892, he was a superintendent on the Great Northern. In 1895 he was superintendent and chief engineer of the Lake Superior & Ishpeming. In October, 1897, he went to the Union Elevated Railroad of Chicago, and he left that position in May,

1900, to become consulting engineer of the Boston Elevated Railway. Later he was made superintendent of that road. From September, 1904, to January, 1905, he was superintendent of the Mexican Tramways Company, at Mexico City, Mex., and since that time has been in the service of electric railways in the United States.

James Edmund Childs, vice-president and general manager of the New York, Ontario & Western since 1904, died on July 16 as the result of a surgical operation. Mr. Childs was born at Neversink, N. Y., in July, 1848, and began railway work on the New York & Oswego Midland, now a part of the New York, Ontario & Western, in April, 1865, as assistant engineer. From 1869 to 1870 he held a similar position on the Chicago & Michigan Lake Shore, now a part of the Pere Marquette. In 1870 he was resident engineer of the Buffalo, New York & Philadelphia, now a part of the Pennsylvania Railroad, and the following year was in the engineering department of the Rochester & State Line, now a part of the Buffalo, Rochester & Pittsburgh. In 1872 he was division engineer of the Wisconsin Central. For two years from 1873 he was assistant engineer of the New York & Harlem, now a part of the New York Central & Hudson River, but in 1876 returned to the Rochester & State Line as chief engineer and superintendent, and five years later went to the New York, Ontario & Western as general superintendent. He was also assistant general superintendent of the New York, West Shore & Buffalo, now a part of the West Shore. From June, 1883, to February, 1884, he was also general superintendent of the Wallkill Valley, now a part of the West Shore. In February, 1886, he was promoted to general manager of the New York, Ontario & Western, and since September 28, 1904, was also vice-president and a director of the company. Mr. Childs will be remembered as one of the "old-fashioned" general managers, such a man as was John M. Toucey, of the New York Central, although his authority was not so great as Mr. Toucey's. His kindliness made him a delightful man to deal with, and his subordinates looked to him alone as the operating head of the road.



J. E. Childs.

A contract has been concluded between Portugal and Nyasaland, Africa, for the construction of a railway starting from the Nyasaland frontier and passing through the Zambesi district to a point not yet determined.

In 1911 there were about 600 miles of railways in operation in Colombia. This total is made up of 12 distinct lines; of these, three unite the adjacent Atlantic parts of Puerto Colombia, Cartagena and Santa Marta with the Magdalena river above the bar, which obstructs its mouth to ocean-going steamers. One line connects the upper and lower Magdalena, another climbs the mountains to the table land of Bogota, from which still another leads across the table land to Bogota, while two more run from that point to the boundaries of the plateau on the north and south. Of the rest two are destined to join the Magdalena river with distant and important points in the interior and the remaining two will run from the interior to the Pacific coast and to Lake Maracaibo. The construction of these lines has been irregular, and, therefore, very expensive, and their utility is greatly reduced by the fact that some of them are merely temporary links which may be rendered useless in the future by a more practical scheme. A plan for the conversion of the gage of these lines to secure uniformity on either side of the river has been proposed, but the cost of carrying this out would scarcely be justifiable, in view of the pressing need of railways in other parts of the country.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE CENTRAL OF GEORGIA has ordered 15 mikado locomotives from the Baldwin Locomotive Works.

THE BELT RAILWAY OF CHICAGO is in the market for 5 switching locomotives and 5 mogul locomotives.

THE MINNEAPOLIS & ST. LOUIS is said to be in the market for 10 locomotives. This item has not been confirmed.

THE CHICAGO JUNCTION RAILWAY is said to have ordered six switching locomotives. This item has not been confirmed.

THE CLEVELAND STONE COMPANY, Cleveland, Ohio, has ordered 1 six-wheel switching locomotive from the Baldwin Locomotive Works.

THE SOUTHERN PINE LUMBER COMPANY has ordered 1 six-coupled double-ender locomotive from the Baldwin Locomotive Works.

THE WOODWARD IRON COMPANY, Birmingham, Ala., has ordered 1 eight-coupled double-ender locomotive from the Baldwin Locomotive Works.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 50 mikado locomotives and 6 Mallet locomotives from the American Locomotive Company.

THE C. A. SMITH LUMBER & MANUFACTURING COMPANY has ordered 3 eight-coupled double-ender locomotives from the Baldwin Locomotive Works.

THE ERIE has ordered 25 mikado locomotives from the American Locomotive Company, 15 mikado locomotives from the Baldwin Locomotive Works, and 10 mikado locomotives from the Lima Locomotive Corporation.

THE CANADIAN NORTHERN has ordered 4 Pacific type locomotives from the Montreal Locomotive Works. The dimensions of the cylinders will be 23 in. x 28 in., the driving wheels will be 69 in., and the total weight in working order 250,000 lbs. These locomotives will all be equipped with superheaters.

THE ILLINOIS CENTRAL has ordered 50 mikado locomotives from the Baldwin Locomotive Works and 20 Pacific type locomotives from the American Locomotive Company. The Pacific type locomotives will be equipped with superheaters, will have 25 in. x 26 in. cylinders, 75 in. driving wheels and in working order will weigh 248,000 lbs.

THE NEW YORK CENTRAL LINES have ordered 20 switching locomotives from the Lima Locomotive Corporation; 50 mikado locomotives from the Baldwin Locomotive Works; 20 Pacific type locomotives, and 10 switching locomotives from the American Locomotive Company. This company is having 107 consolidation locomotives converted into mikado locomotives at the Dunkirk, N. Y., plant of the American Locomotive Company.

CAR BUILDING.

THE RUTLAND is in the market for 8 milk cars.

THE VIRGINIAN is in the market for 700 hopper cars.

THE CENTRAL NEW ENGLAND has ordered 900 box cars, 100 end-door box cars and 50 flat cars from the Keith Car & Manufacturing Company.

THE BOSTON & ALBANY, which has been considering the purchase of freight cars for some time, is now in the market for about 4,000 box cars.

THE SAN ANTONIO & ARANSAS PASS is said to have ordered 5 thirty-ton freight cars from the Mt. Vernon Car & Manufacturing Company. This item has not been confirmed.

THE DENVER & RIO GRANDE has ordered 700 box cars from the Standard Steel Car Company, 350 gondola cars from the Pressed Steel Car Company, 100 stock cars from the American

Car & Foundry Company, and 50 caboose cars from the Haskell & Barker Car Company.

The Erie has ordered 500 forty-ton coke cars from the Pressed Steel Car Company; 300 forty-ton automobile cars from the American Car & Foundry Company, and 25 suburban coaches and 11 combination passenger and baggage cars from the Standard Steel Car Company.

IRON AND STEEL.

The Denver, Laramie & Northwestern is in the market for 5,000 tons of rails.

The Chicago, Milwaukee & St. Paul is in the market for 1,000 tons of structural material.

The Chesapeake & Ohio has ordered 7,000 tons of structural steel from the Pennsylvania Steel Company.

The Lake Shore & Michigan Southern has ordered 480 tons of bridge material from the American Bridge Company.

General Conditions in Steel.—According to steel manufacturers, the demand for steel products continues large, in spite of the fact that the present season is usually dull. New business has exceeded production for the last six or eight months and the steel companies are beginning to receive the full benefits from the advanced prices. One of the most encouraging features is the heavy buying on the part of the railways, for this has exceeded even the most optimistic expectations. On account of the heavy demand for rails, particularly for open-hearth rails, the market for re-rolled rails has considerably broadened, and operations of this class are increasing. All the mills of the Jones & Laughlin Steel Company are running at full capacity and the wage increase just announced by that company will affect almost 6,000 workmen. It is said that this increase will average about 10 per cent. to the workmen employed on the hourly basis.

The Italian minister of public works has approved a project for the construction of a new railway which is to connect Rome with Ostia, a harbor at the mouth of the Tiber river.

Surveys have been made for a line from Shivrajpur, India, via Vamankua, to Pani, about 16½ miles. Shivrajpur is the terminus of the Champaner-Shivrajpur Railway, a short line which has a feeder in the Bombay, Baroda & Central Indian Railway. The new line will have a 2-ft. 8 in. gage.

The 80 mile section of the Bagdad railway, Asia Minor, from Dorak to the foot of the Amanus mountains, was opened to traffic on April 27. Other sections of about the same length from Aleppo to the Amanus mountains and towards the Euphrates river will be opened during the present year. Construction work will soon be started on the section running north from Bagdad, and also on the branch line from Alexandretta, and it is expected that these lines will be completed next year. The Turkish government has decided to abandon Kowit as a terminus of the Bagdad railway in favor of a harbor in the Khor Abdullah, a long narrow inlet at the head of the Persian Gulf, which has for some time been recommended as a suitable terminus for this railway.

The Argentine government granted a concession for the construction of a 340-mile line which will begin at the port of Colonia, opposite Buenos Aires, pass through the center of the country in a southwest to northeast direction, and end at San Luis on the Brazilian frontier. It will be in two sections; one from Colonia to Trinidad, the capital of the department of Flores, and one from that point to San Luis. The government guarantees a dividend of 3½ per cent. on the latter section. The company undertakes to develop the port of Colonia, and to spend at least $1,250,000 on tug-boats and lighters; also to colonize 5,300 acres of land between Colonia and Durazno, and 10,640 acres between this latter city and San Luis, near the line of the railway; and for this purpose to bring into the country at least 1,000 families for this purpose. In San Luis the new railway will have connection with the Brazilian line that runs via Bagé and Passo Fundo to Rio de Janeiro, and part of which is under construction, part already built. Later it is intended to continue this line to Bahia and Pernambuco.

Supply Trade News.

Harry N. Turner has been made eastern railway representative of the Kay & Ess Company, Dayton, Ohio, succeeding D. L. Paulus, who died at his home in Atlantic City, N. J., June 20.

Isaac Block has been made president of the Davenport Locomotive Works, Davenport, Ia., succeeding Hyman Michaels, who died July 10. This company has opened a branch office in the First National Bank building, Cincinnati, Ohio.

Templeton, Kenly & Company, Ltd., Chicago, have moved their Chicago offices and shops from 1335 Sloan street to their new plant at 1016-1024 South Central avenue. A switch from the Baltimore & Ohio Chicago Terminal connects with this plant.

John T. Dickerson has been appointed sales engineer of the Strauss Bascule Bridge Company, Chicago, in charge of the eastern territory, with headquarters at New York, succeeding C. G. Bartram, resigned. Mr. Dickerson has been associated with the Scherzer Rolling Lift Bridge Company, Chicago, in its engineering and sales departments for the past seven years and was previously engaged in engineering work for the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and other roads.

The McKeen Motor Car Company, Omaha, Neb., has received an order from the Australian government for five 200 h. p. narrow-gage motor cars to be delivered at Brisbane, Australia, by January 1, 1913. This is the second order for internal combustion cars received by the company from Australia. The cars are similar to those built for use in this country, with the exception that the rear and front ends are equipped with the English standard style of spring buffers. The cars are for 3 ft. 6 in. gage track and are 59 ft. long.

R. L. Sites, formerly assistant to president of the Wm. J. Oliver Manufacturing Company, New York, and who has represented that company in the New York territory for the last 18 months, has been given an exclusive agency in this territory by that company for the sale of the Oliver dump cars, spreaders, industrial cars, etc. Mr. Sites will retain his present offices at 50 Church street, and will handle, in addition to the above line, two or three other lines of contractors' equipment. He will maintain an agency in connection with the Lines-Flynn Company, New York.

The stockholders of the Hall Signal Company, New York, by a majority of nearly 90 per cent., have approved the modified plan of the readjustment committee, mentioned in the *Railway Age Gazette* of July 12. The fixed charges of the company will be increased immediately from $15,000 to $75,000, as the old $250,000 mortgage will still be carried, and after four years these charges will be increased to $125,000, as $50,000 of the debenture bonds must then be called annually. It is expected, however, that the increased obligations of the new company will be more than offset by the increase in business. The subscriptions are payable in five instalments of 20 per cent. each, the first being due at any time now upon ten days' notice. The readjustment committee will arrange a one-year loan covering the third, fourth and fifth payments, if subscribers so desire.

TRADE PUBLICATIONS.

Pneumatic Tools.—The Thomas H. Dallett Company, Philadelphia, Pa., has published bulletin No. 304 on pneumatic wood carving tools, a new application of pneumatic tools. This bulletin is illustrated and includes detailed descriptions. Prices are also given.

Wheel Presses.—The Watson-Stillman Company, New York, has published catalog No. 85 on its hydro-pneumatic wheel presses, illustrating three types of these presses and listing and describing over 70 variations in type and size of from 60 to 600 tons capacity.

Welding and Cutting Apparatus.—The Alexander Milburn Company, Baltimore, Md., has published a catalog of its oxy-acetylene welding and cutting apparatus and welding supplies. This catalog is illustrated, and includes concise descriptions of the different outfits and brief accounts of the various uses to which they may be put. A supplementary pamphlet furnishes the prices.